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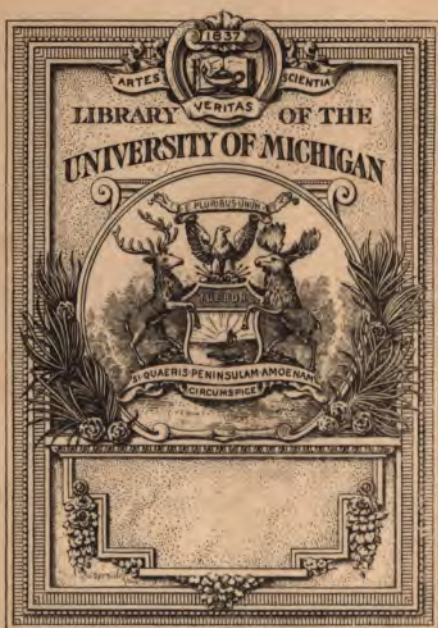
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A NEW MANUAL OF METHOD

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A NEW
MANUAL OF METHOD

BY

A. H. GARLICK, B.A.

(HEAD MASTER OF THE WOOLWICH P.T. CENTRE)

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1896

PREFACE.

SOME years' experience in the teaching of School Method has demonstrated that young students require much more help in this subject than is offered in existing manuals, and that the information contained should be offered in its most serviceable form. In fact, "Centre" experience has shown that no book is suitable unless it is comprehensive in its range, practical in its nature, and modern in its methods. There are books in the market meeting some of these requirements, but none meeting them all. The subject is very wide; the time that can be allotted to it very small: hence the book should be such as to do most of its own teaching. For this reason all the subject matter has been carefully methodised, and much of it thrown into teaching form—the form which is most difficult to young teachers to acquire, and the most useful in practice.

This work is based on the writer's teaching notes during the past ten years; and as it grew to meet the wants of his own pupils for their recurring examinations, it is believed that it will be found specially suitable for pupil teachers and scholarship students.

Every Examination Question in the book is selected from the papers set at the various Queen's Scholarship and Pupil Teachers' Examinations.

A. H. G.

WOOLWICH P.T. CENTRE,
1896.

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A NEW MANUAL OF METHOD.

CHAPTER I.

SCHOOL ECONOMY.

Physiology and Education.—Physiology appears in the Code as a specific subject, and as an appreciable portion of Elementary Science and Domestic Economy. These facts emphasise its importance; but the special object attempted here is to explain that importance by showing the mutually-interdependent relations which Education, Psychology, and Physiology bear to each other.

1. The Popular View.—The popular mind recognises the close connection between Education and Physiology in the use of its maxims and metaphors; *e.g.*, a sound mind in a sound body; an angry man is said to have had his *bile* stirred up; a sad or morose individual is said to be *melancholy* (*melan*, black; *chole*, bile); an irritable or bad-tempered person often throws the blame on his *liver* or *nerves*; a vindictive creature is said to be *splenic*; mercy is associated with the *bowels* (bowels of mercy), and the gentler emotions with the *heart* (tender-hearted).

2. The Scientific View.—The body is an aggregate of organs. Fatigue the body and the organs suffer. But certain organs are the physiological support of the brain, hence the *brain* suffers.

Mental activity goes with *physical activity*; but too much physical exercise is unfavourable to mental work and mental development. Conversely, too much mental activity impairs the bodily health, as is seen in the case of brain-workers who suffer from headaches, nervous disorders, indigestion, etc.

Memory, physiologically, is a series of new nervous growths, and these nervous growths are supported by *nutrition*, which is a physiological process. Memory is, furthermore, a plastic property of the mind, and this plasticity may be injured by too little or too much work. But to increase this plasticity the brain must be worked. All these facts show that if the teacher is to treat the subject of Education scientifically and progressively, he must be well grounded in the elementary principles and truths of Physiology, paying special attention to that part—nutrition—which is the basis of support to all the organs of the body; and nutrition is a branch of Domestic Economy.

Headaches and Faintness.—Headaches arise from various causes, which may require separate treatment. They may arise from diet, or from an impure atmosphere; from mental causes, from overwork, or from physical causes.

1. Food Headaches.—Luxury and overfeeding may be, but in elementary schools rarely are, causes of headaches. Over-indulgence is not very prevalent,

but improper diet is a fruitful source. Costiveness is one result, and this causes an undue quantity of blood to flow to the head, which generates a headache. Excessive use of aperient medicine, and hearty suppers, are other causes. Digestive arrangements cause sick headaches, and, generally, anything which tends to interfere with the circulation must be avoided. As a remedy, Domestic Economy lessons must be utilised to encourage the pupil to take plenty of exercise; to explain the nature and effects of stimulating food; to avoid all foods which make too much flesh, and to drink water only.

2. From Impure Atmosphere.—If there be too much CO_2 in the air, giddiness sets in. The pressure of the CO_2 in the air retards the elimination of the CO_2 from the lungs, and general nutrition is impaired. A headache is then one of the results. Coke fires give off CO_2 , which displaces O from the red corpuscles, impoverishes the blood, and causes headaches. Sulphurous acid, which is always in the air of towns, and near fires, is also bad. Organic putrescible matter which is breathed forth from the lungs, exhalations from sickly boys, and the foetid smell arising from damp clothing all taint the air and produce headaches. Foul gases from bad drainage and damp basements, the dust in the air, chalk dust and similar impurities, and an overheated temperature are other causes. The remedy is to seek the cause, and if possible remove it. The lessons on health should lead to prevention, but some of these causes will be beyond the teacher's control. Pure air and a proper diet, however, always tend to cure.

3. From Mental Causes.—The child may be overworked. The lessons may be too exacting for the constitution of some. The excitement of examinations, anxiety, worry, etc., will all produce headache at times. In such cases the teacher should shorten the hours of study, recommend more exercise, and the keeping of the body well nourished.

4. From Physical Causes.—These will include such things as tight lacing, tight collars, tight boots, etc., too little or too much muscular exercise, insomnia. The quantity of sleep required depends very largely on the work and temperament of each individual. The sufferers should be advised to dress reasonably, to regulate the quantity of exercise taken, and to indulge in a fair amount of sleep.

LIGHT.—"Light goes with knowledge, and assists to develop mental power."

1. Direction of Light.

- (1) It must not come direct from the front. This is its worst direction.
- (2) It should come from a point on either side, the *left* being the best, especially for class rooms. All other windows in class rooms should be regarded as supplementary, or for summer ventilation.
- (3) Or, it should come from a point above the shoulder.
- (4) Or, from behind.
- (5) It must not enter from both sides of the room, unless the room is very large. At the same time, no school should be lighted from one side only, but the gable ends should be fully utilised for light.

2. Diffusion of Light.

- (1) Light should be equally diffused throughout the room.
- (2) The main light should be from the north, because it is steadier and cooler.
- (3) The light should be abundant, but all glare should be avoided. Hence southern windows are not the best, although there should be one southern window for cheerfulness.
- (4) The colour of the walls should assist, and grey is best for this purpose. All kinds of glazing which diminish the light and are troublesome to keep in repair should be avoided.
- (5) The sills of the main lighting windows should be placed about four feet above the floor, and the tops of some should always reach nearly to

the ceiling. In fact, the higher the windows rise to the ceiling, the better for light and ventilation. A dim religious light may be good for sentiment, but it is bad for health. If the windows can be placed six or seven feet above the ground, so much the better, for the diffusion of light is better, and shadows are avoided.

- (6) When windows are low, side lights are preferable, and the left side is always the best.
- (7) A domed roof is best for light, whilst flat skylights should be protected by proper blinds.
- (8) A large portion of each window should be made to open for ventilation and cleaning.

3 Artificial Light.—Wall lights are bad, because the air soon becomes impaired. Cross lights are to be avoided, because they multiply shadows. Gas is not a desirable form of lighting from a hygienic point of view, although the incandescent gaslight system is a great advance in this form of lighting. The electric light would be an improvement.

VENTILATION.—The teacher should be acquainted with its main principles.

1. Its Difficulties.—These arise from various causes.

- (1) The different forms of building in use.
- (2) The aspect of the rooms.
- (3) The nature, size, and position of the surrounding objects.
- (4) The difference of constitution, temperament, and health.
- (5) From overcrowding.

It will be easily understood that what may be a good arrangement for one building may fail to suit another. If the windows face the prevailing winds, and these happen to be of an unfavourable nature, then further difficulties are raised. High buildings, objectionable factories, etc., when near, are all serious considerations. But perhaps the most important of all is the negligence of many to use the means at their disposal for good ventilation.

2. Cubic Space.—Cubic space is but little guide in school statistics, for the number of children a room can accommodate depends on several things which do not enter into the usual considerations of these matters. Furthermore, the age of the children is an important factor. The Department recommends the following desk space:—

18 inches for each junior desk.
 22 " senior "
 18 " the gangway.

But on the point of health this is not satisfactory. We each breathe about 16 times a minute, or 960 times in an hour, and every breath helps to vitiate the air. Each adult destroys 16·6 cubic feet of air per hour, 100 times that quantity per hour being required to keep the air pure. Remember that three scholars equal two adults. Now, in pure air we have '04 of CO₂, and 1 per cent. will give a headache, whilst 4 per cent. would be fatal. When too much CO₂ is produced a foetid smell arises, and this is the result of overcrowding or bad ventilation. Other evils are the raising of the temperature and the production of draughts. Each individual requires 2800 cubic feet per hour. All impurity must be removed from the air. Draughts must be prevented, and cold air must be warmed as admitted.

3. Means of Ventilation.

- (1) **Doors and Windows.**—All windows should be made to open top and bottom; a slight opening both top and bottom being effectual. Windows are best for ventilation, and the window space should be at least one-fifth of the wall space. A small swing window, as far from the lighting windows as possible, and near the ceiling, is important.
- (2) **Gratings.**—These can be used in connection with fireplaces and stoves.
- (3) **Shafts.**—Shafts like the vertical shaft ventilators can be used. For the admission of fresh air a Tobin ventilating shaft in the corner of the

room is recommended. It should communicate below with the outer air, and open about seven feet above the floor, so as to introduce a current of air where no draught will be felt by the head.

- (4) **Ventilators.**—The principal use of these is to prevent the collection of stagnant air. There are many good kinds in the market, including the cowl ventilator, Arnot's Balance Valve, and the Louvre Ventilators.
- (5) **Fireplaces.**—A wide open chimney is desirable in small rooms, but they are unsatisfactory in large rooms. Ordinary closed stoves are bad. There should be provision for the outlet of foul air at the highest point of the room. This can be best done by building to each room a separate air chimney, carried up in the same stack as the smoke flues. An outlet should always be warmed in some manner, or it will frequently act as a cold inlet. The exits for foul air should be greater than the entrances for pure air.

WARMING.—The warming should be moderate, and evenly distributed, so as to maintain a temperature of from 56° to 60° F. When a corridor or lobby is warmed, the rooms are more easily dealt with, and are less liable to cold draughts. Where schools are wholly warmed by hot water, the principle of direct radiation is recommended. In such cases open grates are occasionally useful for extra warming, and their flues for ventilation always. Stoves can only be allowed if they are provided with proper chimneys, and are found not to contaminate the air, or to render it too dry.

The Thermometer.—The walls of a school should never be allowed to cool down below 45° F. night or day. An equitable and suitable temperature is a great desideratum for warming. The thermometer should not be hung near a fireplace or stove, nor in the direction of any draught, nor in too close contact with gas. It may be hung upon a wall as near the centre of the room as possible, provided it does not infringe any of the above suggestions. It must be hung where it will give the best measure of the average temperature of the room, and this will depend very largely upon the plan or shape of the room, and its locality.

Cleaning.—The following suggestions apply to the school, and not to the home :—

1. The school should be swept and dusted each day.
2. The floor should be scrubbed every few weeks.
3. The windows should be cleaned as often as the weather and other circumstances make it necessary ; but in any case once a quarter.
4. Stoves and fireplaces should be cleaned weekly. When fires cease, the stoves, etc., should be fresh painted.
5. The walls should be swept down once a month (oftener in some cases), and the pictures, maps, and diagrams dusted. All framed pictures should be washed once or twice a year.
6. Every three to seven years, depending on the neighbourhood and use of the schoolrooms, the whole building should be painted inside and out.

Drill.—Drill is perhaps the chief recognised means of promoting Physical Education in the school, whilst the encouragement and carrying out of games is the chief means outside the school. Both are essential to the maintenance of a good standard of health.

I. Its Objects.—These may be briefly enumerated as follows :

1. To promote an improved blood circulation.
2. To take away from the muscular system a tendency to improper contraction.
3. To aid in the formation of proper habits of subjection.
4. To act as a check against absent-mindedness.
5. To promote a love of order.
6. To afford an easy and effectual mode of promoting habits of prompt obedience.
7. To harden and develop the muscular system generally. To improve the health by a proper action of all the organs.

A consideration of the above will show the two main functions of drill to be a cleansing process and development. Its influence is very wide, for it makes healthy subjects and law-abiding citizens. It quickens the actions, and the mind sometimes, and so makes better men of business. It encourages habits of neatness, promptness, cleanliness, ready obedience, and order. It develops a love of action, which finds vent in our national games, and so acts as a great moral agent.

II. General Principles and Rules.—These are largely gathered from observing children at play.

1. Movements should not be confined to arms alone. The various postures into which children unconsciously throw themselves show the necessity of exercise for every part of the body.
2. No one part of the body should be exercised too long. Children illustrate this law by their constant change of games.
3. Begin with easy movements first; then follow with the more fatiguing ones; *i.e.*, the training should be gradual.
4. The lessons should be frequent and regular. A few minutes each day is better than one long lesson per week. In fine weather use the playground; in bad weather, the largest room.
5. The children must be suitably dressed. Tight fitting garments are injurious.
6. Respiration should be perfectly free during exercise; the chest well expanded, the head erect. A child suddenly getting red in the face should be told to breathe freely, as checked or impeded respiration is often the cause of the raised colour.
7. Pallor is a sign that the exercise is too severe. Withdraw such children immediately.
8. Each movement has a definite aim in the physical education of the body. Teachers should strive to achieve this aim by insisting on precision and steadiness of movement.
9. The children should stand at arm's length from each other.
10. Give a few seconds' rest between each movement.
11. The teacher should correctly perform each new movement before commanding it to the class.
12. Corrections should be short and clear. They should be made when children are resting.
13. Each movement should be repeated three or four times.
14. The "word of attention," which tells children what movement is to be taken, should be given in a calm, descriptive manner.
15. The "word of execution" should be given in a sharp, decisive manner as a rule.

THE PLAYGROUND.

I. Physical Uses.—A playground is the lung of a school. It is as essential to a proper and efficient education as the school-room itself. It is the workshop for the manufacture of the sound body, as the schoolroom is for the sound mind. It offers relief after mental work, and brings into play the overcramped muscles. It is a healthy agency for the overflow of that abundant spontaneity of child life, which may become so troublesome to discipline if not regulated.

II. Its Fittings.—A playground should be fitted with gymnastic apparatus, like the giant-stride, parallel bars, etc., and a drinking fountain. One portion should always be covered in to meet cases of bad weather. Offices should be provided, and should meet all requirements of cleanliness, decency, and accommodation. It should be well detached from the street (in towns), by a high wall, by position, or by both. If large, around its edges and near the walls, a narrow strip might be devoted to the cultivation of shrubs, flowers, etc. It should be asphalted if possible, and drained by the placing of small sinks, and the slight sloping of the playground towards them.

III. Its Moral Uses.—It brings brightness to the school life, and helps to engender a love for school by making it popular. It is a fine training ground for the emotions. Boys learn to discipline themselves in their sport, to submit their wills to the will of others. It is a great leveller and compensating force; for the dullard may be a physical adept. He wins in the playground that respect which he cannot attain in the school; for muscle is worshipped as much as brain. The bully is checked, the timid and shy get nerve and confidence by means of the playground's supervised play.

IV. The Teacher's Work.—Gymnastics should be encouraged by the teacher, and, in the case of boys, a little instruction might be given. Supervision should always be exercised. The presence of the teacher will often tempt a boy to try something which otherwise might be beyond his inclination. Games calculated to develop their strength, to give muscular control, to aid the growth of the will, such as our popular games, should be encouraged, sometimes shared, and sometimes directed by the teacher. Many now form and take an active interest in the cricket, football, and swimming clubs of their scholars, and they do not find it unproductive labour.

FURNITURE.—Students are expected to know something about the furnishing of a workman's home, and to offer sound opinions on it. Their knowledge is also expected to extend to the school furniture, hence this is thought a convenient place for dealing with several of the more important articles found in a school, such as the school museum, desks, galleries, and wall decorations.

The School Museum.—Every school should contain its museum, which should be formed by the pupils and staff so far as its contents are concerned, and should not be purchased. The managers should supply the cupboard only. It should not be turned into a lumber cupboard, or it will smother all interest in itself. The objects of choice will vary somewhat with the district. Regard should be paid to local requirements and local scenery. These considerations will regulate the choice of the special objects for the museum, whilst there will always be a number of objects which may find a place, and these may be called the general objects.

1. Special Objects.—These should be classified :—

- (a) **Animal Kingdom.**—There should be specimens of local birds and their eggs, of insects, fish, classified feathers, bills or beaks, feet, etc., of birds, and so on.
- (b) **Vegetable Kingdom.**—There should be a collection of wild flowers belonging to the district, properly pressed and classified. There should also be carefully prepared specimens of the leaf, the flower, the fruit of the trees, the ferns, the grasses, weeds, cereals of the district ; sea weed (if near the sea).
- (c) **Mineral Kingdom.**—There should be illustrations of the geological formation of the district. Models of the district should be made and contributed by the teachers or scholars. If the school is near the sea, there should be typical stones and shells from the sea shore.
- (d) **Manufactures.**—The local manufactures (if any) should be illustrated as much as possible. The material used should be shown in its various stages. Models of machines might be made, and models or specimens of tools. If the town is a port, there should be models of the various kinds of ships and boats, and the boys should be taught to distinguish the craft by name (sloop, barque, etc.) ; to know the flags of the chief countries, and for this purpose a picture of flags should be placed in the schoolroom. If a mining town, the same method should be pursued with the mine.
- (e) **Antiquities.**—There should be drawings, photographs, and specimens illustrating the antiquities and historical associations of near places.

2. General Objects.

- (a) **Scientific Apparatus.**—By this is meant apparatus for object lessons and science lessons, and, where possible, this apparatus should be made by the pupils.
- (b) **Commercial Specimens.**—These would include specimens of the chief exports and imports. Where these are objects of manufacture, they should illustrate the whole process from the raw material to the finished article. The specimens must be limited to the chief only, and they

should be arranged in the order of their importance, *i.e.*, our greatest import, export, and manufacture should have their specimens respectively occupying the chief places of their class.

- (c) **Common Objects.**—These should be limited to the commonest specimens of the three productive kingdoms—animal, vegetable, and mineral. Specimens of the chief woods, the chief rocks, etc., should be arranged in the order of their importance. Object lesson materials, in so far as they are not what are technically known as “Scientific,” should also find a place.
- (d) **Inventions.**—It might also be made a receptacle for the inventive faculties of the children, to encourage production according to the special tastes and talents of the pupils, and for this purpose the selection need not be wholly scientific.

3. Its Value.

- (a) It is *economical*, because it supplies concrete or objective information to the pupil with the least expenditure, generally, of time and trouble.
- (b) It trains the *attention* by fixing it and bringing *interest* to its aid.
- (c) It stimulates *observation*, and the habit of care which this involves reacts on and influences all their other work.
- (d) A *love of nature* is encouraged, and followed by widened sympathies and enjoyments. In this way it may prove a stepping stone to a love of knowledge, gained by the most productive and the most pleasurable means.
- (e) It affords scope for hand and eye training; for the *cultivation of the senses* by the manufacture of models and apparatus.
- (f) It is a fine *disciplinary aid*. The children love such work, and by association get to like their school, and to take a real pride and interest in it.
- (g) It widens their *vocabulary*. The things observed and described call into use exact and correct *language*, which improves their power of *composition*.

Galleries.—Infant children receive many lessons upon galleries, hence it is necessary that each should be properly constructed and properly placed. They are rarely found now anywhere but in Infant Departments. They are conducive to noise very often, and for that reason are not an unmixed blessing in the principal rooms. If the room is large, and the galleries are placed as far apart as possible, the noise is minimised; but a separate class room is the best place for a gallery. On galleries for older children desks might be placed, and then the front desk could rest on the floor. In fact, a gallery then differs very little from the desk-fitted, stepped floors of the modern Board Schools.

The **construction** of the gallery will depend somewhat upon where its place is, and its size also. In a class room it may be larger than in a principal room. A gallery usually contains five parallel seats, each rising above the other like steps. Each seat is about 14 or 15 feet long, depending on the number of children it is intended to seat. It should be so constructed as to allow the youngest children seats at the bottom. The following dimensions are recommended :—

- (1) The *rise of the seat* for the youngest child should not be greater than 7 inches.
- (2) This should be *increased each row by half an inch* for the varying ages and sizes of the children.
- (3) There should be a *gangway up either side*, allowing plenty of room for either teacher or children to ascend or descend. Sometimes there is one central gangway, but this is not so good as the other method.
- (4) There should be a *sloping back* fitted to each seat for the infants, about 8 inches high.
 - (a) It is necessary for health.
 - (b) It leaves the child the free use of its arms. A higher one would not.
 - (c) It protects the child from the restless feet of those on the seat above.
- (5) Each *step* should be nearly 2 feet wide, and the seat should be so placed as to leave at least a foot behind.
- (6) The *walls* should be boarded near the gallery.
- (7) There should be a *hand rail* suited to the size of the children, and placed on the exposed side of the gallery. If both sides are exposed, then there should be a railing on either side.

Desks. I. Infant Departments.—Desks are used in these departments for writing or for kindergarten. No desks are required for the youngest.

The height varies from $17\frac{1}{2}$ to $19\frac{1}{2}$ inches; the seats, from $10\frac{1}{2}$ to $11\frac{1}{2}$ inches. The back rests should be curved, and the centre of support should be about 7 inches above the seat. The top of the desk should be flat. It suits for kindergarten, but not for writing, hence the tops should be adjustable so that they could be made horizontal or angular as required.

II. Other Departments.—The London School Board issue some *general rules* on this subject, as laid down by their medical officer.

1. The seat should not be so high as to prevent the child resting its feet upon the floor, or on a footboard, and if the latter the knees should not be elevated.

In those classes where the scholars change places, the height of the seat should be capable of regulation in proportion to the height of the pupils.

2. Assuming a child to be sitting upright in his seat, and the arms to be hanging freely down, the edge of the desk next the body should be about an inch higher than the level of the elbows in the boys, and from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches in the girls.

If the desk be higher than this, there is a tendency for the body to be twisted, for one shoulder to be raised above the other, with the consequent risk of lateral curvature of the spine.

3. A line dropped from the edge of the desk ought to strike the edge of the seat, or at a point an inch or two within it.

This arrangement obliges the child to assume an upright position, which is best both for the eyes and the spine.

4. No seat should be without a back, and the top of this should be one inch lower than the edge of the desk for boys, and one inch higher than the edge of the desk for girls.

In schools which are graded, great inequalities will be found in the size of the scholars in each room, to meet which it would be desirable to provide three sizes of desks. In schools of mixed ages there should be a large number of sizes.

5. The desk must not be flat. It should slightly incline towards the child.

6. The seat should not be flat, but saddle-shaped. Change of position will be desirable.

7. The desks must be easy of access, yet compactly arranged. The angle of vision for the teacher should not be more than 45°.

Height and Dimensions.

- (1) The sloping part of the top should be not less than 12 inches in width.
- (2) The inclination should be about 2 inches, and the slope should be about 1 in 10.
- (3) The flat portion of the desk with the groove should be from 3 to 3½ inches in width.
- (4) The proper height allows the forearm of the seated child to rest horizontally upon it without discomfort.

(a) Youngest children	-	-	20" to 25"	to the middle of the slope.
(b) Intermediate children	-	-	22" to 26"	"
(c) Oldest scholars	-	-	30" to 36"	"

The seat should be 16½ inches high.

- (5) The back rail should be not more than 7 inches for younger children, and not more than 10 inches for the older ones.
- (6) The minimum space for each child should be 20 inches, and 22 inches would be better.
- (7) The width of the gangway should be 18 inches at least.
- (8) The seats should be 8 inches wide.

Best Position in the Desk.

- (1) Sit erect.
- (2) Keep the eyes in a parallel line with the surface of the desk.
- (3) Keep the shoulders at equal heights.
- (4) Keep the elbows close to the side, and not resting upon the desk.
- (5) Weakly and delicate children should have a support for the whole of the back.

Schoolroom Decoration.

1. Walls.—These should be clean, and painted a light French grey or pale buff. The lower part should be of wood panelling, or, better still, of dark glazed bricks, so as to form a dado.

2. Windows.—There should be an abundance of window-space. Nothing tends to brighten a room like this. The blinds should be well-kept and clean, and the frameworks should be regularly painted.

3. Pictures.—Pictures of foreign scenes are interesting and instructive, especially those dealing with primitive forms of life, like the African, the Indian, and the Esquimaux. A few good pictures, copies of our best masters' works, might be added. Historic pic-

tures are very interesting to children, and are all the brighter for being coloured. Pictures of trades, brightly coloured, are also very instructive, and very interesting, whilst a few well-chosen Scripture prints should always find a place.

4. Maps.—Picture maps are bright and instructive, preparing the way for the ordinary maps. Of those hanging on the walls, the ordinary ones should be bright-coloured, and should be removed as soon as they become dilapidated or dirty. In such a condition they are little good mentally, and positively bad morally. A few blank maps should be included among the wall decorations.

5. Diagrams.—These will include geographical diagrams for the teaching of definitions; astronomical diagrams for lessons on the sun, moon, and stars; botanical diagrams for botany lessons; mechanical diagrams for lessons on mechanics; zoological, for lessons on animals, and so on. The choice of these diagrams will be regulated by the school curriculum.

6. Honour Board.—This should form a most appreciated portion of the wall decorations of a school.

EXAMINATION QUESTIONS.

1.—Write out some of the chief principles to be observed in the lighting and ventilation of schoolrooms.

2.—What directions would you give for the daily and weekly cleaning of a school-room? What additional cleaning is needed at longer intervals?

3.—What are the objects of school drill? Show that it has an influence upon the character of children and their behaviour out of school.

4.—What do you consider to be the uses of a *playground*, and how would you endeavour to make it subservient to the discipline of a school? To what extent (if any) would you take a personal part in the children's play?

5.—What kind of desks would you like to find in any schoolroom in which you might have to teach writing? Give the ground of your preference.

6.—What sort of objects would you desire to collect in a school museum, and how would you classify them and use them?

7.—Describe the proper height and size of desks: (1) for an infant school; and (2) for a school of older children. Say how desks ought to be placed in reference to the light.

8.—Give a list of the maps, pictures, diagrams, and apparatus which you think ought to be provided in a well-furnished schoolroom.

9.—What sort of decoration is most appropriate in a schoolroom, and most likely to make it bright and attractive to the scholars?

10.—What rules should be adopted by a teacher in order to keep the schoolroom perfectly healthy and clean?

11.—Describe the best system you know of drill and physical exercise for young children (a) in the schoolroom; (b) or in the playground; and say what sort of apparatus would be of the most service in such exercises.

12.—Describe the most healthful and useful exercises in drill which you have seen, and say how you would conduct them.

CHAPTER II.

DISCIPLINE.

I. What it is.—You know a tree by its fruit, and Discipline is known by its results.

1. It must be based on Natural Principles.—It must recognise the child's love of activity and curiosity, and it must understand that these and similar impulses may lead the child to do injurious things. It must recognise the weakness of a child's intelligence, which cannot always detect the relation between action and result. It must recognise that character is a growth, and that discipline is the natural trainer and corrector of that growth.

2. Its Aims must be Good.—It ought to produce pupils who are not ashamed to confess ignorance by asking a question, and who show a willingness to be taught by any one. Do the scholars take pains with their work? Do they love and seek their work? Is the discipline sufficient to restrain all the unruly impulses of the children? Is it maintained by love or by fear? Does it make a right use of punishments, recognise the inborn idleness of some natures, and seek to remove it? Does it cultivate the amicable sentiments? Does it check and regulate moral precocity, which is always an expensive luxury? Does it make a proper use of the discipline of consequences? Is it consistent, and does it tend to develop a self-governed being? Is it in harmony with the child's nature, and does it possess sufficient flexibility and versatility, which are necessary from an analysis both of children and self?

In so far as it fails in any of these objects, it fails to be good; hence it is not sufficient to say that discipline is the power exercised by the teacher over the children, for that power may be bad.

II. Ways and Means.—Discipline must be obtained in one of two ways—by personal influence or by force. "It is better to gain it by force than not to gain it at all" (Fitch).

1. Material Means.

- (a) Good physical surroundings are essential. Ill furnished, badly lighted, badly ventilated, dirty, unattractive, or badly planned buildings, limited or insufficient playground accommodation, difficult or inconvenient means of entry and egress to school or classes—all such are impediments to good discipline.
- (b) The dress, manner, voice, and bearing of the teacher should be pleasing.
- (c) A certain formality and dignity should be maintained. It aids the influence of the teacher, and generates a certain amount of advisable awe.
- (d) There should be a due alternation and remission of work. Suitable changes and a fair amount of recreation are great aids.

2. Mental Means.

- (a) All duties and offences should be expressed in simple, clear, and precise language. The rules should be few and well understood.
- (b) Offences should be graduated, and for this purpose the teacher must know the principles of punishment.
- (c) There should be efficient organisation, classification, and thorough supervision.
- (d) The reasons for discipline should, as far as possible, be made intelligible to the children. Knowledge breeds confidence, and tends to obedience.
- (e) The methods of teaching used should be carefully studied, so as to produce the maximum gain at a minimum cost of temper and brain.

3. Moral Means.

- (a) **Punishment.**—A right use of punishment is very important. Never chide hastily, but correct with gentleness and with evidence of pain. Seek to encourage, rather than to degrade. Have as few restraints as possible, and gradually shift the responsibility from the shoulders of the staff to that of the scholars. With the elder scholars there is nothing like a feeling of responsibility for the production of a healthy discipline, although, at the same time, it must be remembered that this is not recommended for young children. Every teacher possesses more or less tact, and the quality of his discipline will largely depend upon what use he makes of this important talent.

By *tact* is meant a keen observation of what is going on, of everything within the knowledge or experience of the teacher, and a readiness to convert these extraneous incidents into immediate allies. Nor does it finish with a quick and thorough observation. There must also be good and swift discrimination for the exercise of sound judgments.

- (b) **Government.**—Avoid over-government. This is the antithesis of feeble government, and is, perhaps, as much to be condemned. The teacher must remember that authority exists for the benefit of the governed—not for the governors. For this purpose the voluntary dispositions of the children should be trusted as much as possible. A good class opinion should be created, as well as a pride in the moral condition of the school.

4. Older Children as an Aid to Discipline.

- (1) By their own *example* they can aid, for imitation is the strongest faculty in children. Admiration and esteem for the elder scholars is generally manifested by the younger ones, and they always evince great pleasure at recognition or notice by the elder ones.
- (2) By *supervision*. The qualities mentioned should be turned to account by the elder scholars to aid in the maintenance of discipline, both out of and in school. They can share the games of the younger ones, or they can control them. They can act as monitors, assist in regulating assembly or dismissal, and generally hold a light controlling hand over their younger schoolfellows,

- (3) By *protection*. They could and should aid to protect the property of the school, the persons of the scholars, and the character and reputation of the school.

ORDER.—Order is the groundwork and essential of all method. Just as order is said to be Heaven's first law, so should it be made the first law of life, whether in school or out. Without it efficient instruction is impossible. The best economy of time and force demands a place for everything, and everything to be in its place. There is a time for everything, hence there must be definiteness and an absence of procrastination. Order involves the doing of the right thing in the right way, time, and place by the right person.

How to get it.—The teacher should demand order, and then see that he gets it. He must have a perfect control over himself and over the school. He must be quiet in voice and manner, and his voice must be heard as rarely as possible for the efficient discharge of his duties. He must be orderly in his habits, person, and school arrangements. He must be quick of eye and ear, and possess tact, if he is to be something better than a drill sergeant. He must feel and show sympathy with the scholars in their work and play. He must have just and intelligible rules, and these must be uniformly enforced. He must avoid over-government, as it is irritating and wasteful.

There must be regularity in the school movements, and a certain amount of uniformity. Industry must be enforced, and quietness must be ensured—not too much quietness, as it is unnatural to child life, and bespeaks restraint rather than order. The busy hum of an industrious school is no evidence of a lack of order. Orderly methods of work should be demanded and taught, with neat and well-arranged slate and paper work. The children should always be arranged in an orderly manner. The appointment of monitors, curators, etc., will conduce to order, and a good time-table will assist. Finally, the teacher should see that there is good organisation, classification, and careful supervision, with good and comfortable physical surroundings, *i.e.*, a well-warmed, well-lighted, well-ventilated, and well-furnished school.

PARENTAL CO-OPERATION.

A great deal of importance should be attached to this, and it will pay the teacher to get known among the parents of his pupils. Circumstances may vary, and each teacher may probably be the best judge as to the best means of doing this in his own particular

case. Nevertheless, a few suggestions are here offered for any cases where they may be applicable, and are wanted.

1. Correspondence.—A great deal may be done by a judicious letter now and then for special cases; but, as a general method, it would be too expensive in time. It cannot, from staff limitations, be used as a sole means; yet it is a good ally to other means.

2. Visits.—These are very productive so far as they go, whether paid or received; but necessarily they cannot go very far.

3. School Entertainments.—These may take the form of concerts, entertainments, or prize distributions, and they are the best means at the teacher's disposal for securing the object desired. The parents generally like to attend such meetings, and in this way they get to know the teacher, and to be known, in a pleasant manner; both parents and children see the social side of the teacher's character. Experience recommends this method. It is a good investment for the teacher; for discipline becomes easier, attendance better, and parental support more general.

4. Local Residence.—To reside among or near the parents is to place one's-self in a favourable position to become known and appreciated. Unfortunately, in many of the large towns, it is scarcely possible for teachers to reside in the locality of their schools.

5. Local Affairs.—The teacher can interest himself in local affairs. This will bring him under the notice of the parents; he will be better known, and light goes with knowledge. He will be better treated, better respected, better appreciated as ignorance of him, and perhaps prejudice in some cases, slowly melt away before a growing knowledge of his character. The multifarious associations, classes, societies, etc., in most parishes, will give him ample opportunity. The Vestries, Councils, and Corporations will give him an opportunity sometimes of serving his fellow-townsmen in a voluntary capacity, and of forming a powerful circle of friends and supporters.

6. Local Press.—Where possible, he should enlist the aid of the local press, which is sure to be read by many of the parents. Report the successes of the school; its meetings, social and otherwise; the performances of distinguished scholars. The interest of the scholars and parents will be aroused, their sympathies enlisted, and their co-operation stimulated.

AUXILIARY MEANS OF TRAINING.

Besides the usual course of school work, an excellent school seeks by other means to be of service to the children who attend it. Such means would embrace many expedients, among which the following would be included :—

1. Recreation.—The establishment of **Athletic Clubs**, such as football, cricket, and swimming, is now very general. A **Ramblers' Club** affords pleasure and profit if the teacher knows some Natural History. In each case the teacher should support the club by his presence. The manly and useful qualities, so well inculcated by our English games, when properly played, are among the most valuable results of our educative system. **Concerts** have already been referred to. The establishment of a **School Library** would supply another healthy and educative source of recreation, and would help to form that love for sound literature which is such a blessing in after life.

2. Assistance.—Thrift might be encouraged by the adoption of **Penny Banks**. The teacher might also seek to cultivate influence with neighbouring employers, so as to help to **place some of the boys** when leaving school. Other means of assisting will probably present themselves. Locality may afford or deny advantages of this sort, but where the teacher shows practically that he is concerned about the future welfare of his scholars, his influence will be none the less, and his success will be all the greater. In the poorest districts, the practical interest shown by the teachers in the **penny, half-penny, and free dinners**, and their appeals for cast-off **clothing**, is splendid evidence of the missionary spirit which many of them bring to bear upon their work.

PUNISHMENT.

I. Its Limits.—The subject of punishments is the most difficult and the most vexed in school management. There is a great and striking diversity of opinion on the subject. The teacher must remember that all punishment is suffering, and, as such, is an evil. Hence it should only be inflicted when necessary; and since it is intended to supply a counteracting force, weak punishments may be the worst of punishments. A pupil should never be punished at the moment of offence; never when he is not expecting it; and for serious cases always in private. The teacher should always look for the motive, as it is that which has to be checked; and only punish when that motive is a bad one. To punish judiciously

and profitably much experience is required. Young teachers have not this experience, hence if they punish at all they should begin with light punishments. Unjust punishments are injurious morally, mentally, and physically. They breed bad feeling between teacher and class; they check the activities of the child, and often place the teacher in a dangerous and uncomfortable position. Hence seek to limit them as much as possible.

II. Cases for no Punishment.—These, as laid down by Bentham, are :—

1. **Where it is Groundless.**—These would include such cases as these :—
 - (a) Where there has been no real mischief, the other party consenting.
 - (b) Where the mischief is outweighed by a greater benefit.
2. **Where it is Inefficacious.**—Such cases exist when :—
 - (a) The penalty has not come under the child's notice.
 - (b) Or, when he is unaware of the consequences of his act.
 - (c) Or, when he is not a free agent.
3. **Where it is Unprofitable**—This includes cases where the evil of the punishment exceeds the evil of the offence; or when it is likely to be useless through a weak will. The teacher must know what these evils are to measure them. Such evils of punishment would include :—
 - (a) Coercion or restraint.
 - (b) The uneasiness of apprehension.
 - (c) The actual suffering.
 - (d) The suffering caused to sympathisers with the sufferers.
4. **Where it is Needless.**—It is needless when the end can be obtained in some other way; as by instruction, persuasion, etc. Such cases would include obstreperousness in boys, some forms of crying, and cases in which the discipline of consequences avails.

III. The Amount of Punishment.—The amount should be a varying quantity, regulated by the following factors :—

1. **Profit.**—By this is meant that the punishment should be such as to clearly outweigh the profit of the offence.
2. **Mischief.**—The greater the mischief of the offence, the greater the expense it is worth while to be at in the way of punishment.
3. **Grades.**—If one fault is greater than another, the punishment for the greater should be such as to make the less preferred; *e.g.*, truancy and lying should be punished more severely than simple truancy. But the punishment must only be great enough for the purpose.
4. **Motives.**—The punishment should be so adjusted that for every part of the resulting mischief a motive may be supplied to restrain from committing the same fault again.
5. **Individualities.**—The circumstances affecting the sensibility of the offender should be taken into account, such as age, constitution, position in school, etc., so that the same punishment may not operate unequally.
6. **Certainty.**—The less certain the punishment, the greater it should be.
7. **Proximity.**—The longer a punishment is delayed, the greater it should become. Penalties that are uncertain or remote fail to influence the mind.
8. **Habit.**—When the fault indicates a habit, like truancy, laziness, or unpunctuality, the punishment must be increased so as to outweigh the profit of other attendant offences that the offender may commit with impunity. This is severe, but necessary.
9. **Absolutism.**—A punishment may be well suited in quality, but it only exists in one absolute quantity. Nevertheless, it may be advisable to employ it, although a little beyond the measure of the offence; *e.g.*, expulsion, dismissal

from office, etc. And this may be the case more particularly when the punishment constitutes a moral lesson.

10. Limitations.—The quantity of punishment administered must always be regulated by the cases for no punishment. Again, if the punishment is more likely to do harm than good, it should be omitted.

IV. Selection of Punishment.—Here again Bentham lays down certain conditions which must be considered :—

1. Variability.—A punishment should have degrees of intensity and duration ; *e.g.*, fines, corporal punishment, detention, censure.

2. Equability.—The punishment should have equal application under all circumstances. It should be adequate, just enough only. This is not easy.

3. Commensurability.—Punishments should be so adapted to offences that the offender may clearly conceive the inequality of the suffering attached to offences of different degrees of guilt.

4. Exemplarity.—The punishment should furnish an example, and to do this it should be duly impressive.

5. Frugality.—By this is meant that a profitable turn should be given to the punishment.

6. Reformation.—The punishment should tend to reform by weakening the seductive and by strengthening the preserving motives ; as in giving habits of labour to the idle.

7. Efficacious.—It should be efficacious in disablement, as in deposition from office.

8. Compensation.—It should be made to grant compensation, as in making children pay for damage to property, and in making up for neglected lessons.

9. Popularity.—It must be popular to gain school sympathy, otherwise the punishment is weak.

10. Description.—It must be simple of description, and within easy grasp of the child's intelligence.

11. Remissibility.—As in the case of a mistake.

V. Kinds of Punishment.

1. Blame.—All forms of censure may be used, because they are a good and ready method. But the teacher should be sparing of it. Righteous and controlled indignation is a powerful weapon, which should be reserved for special occasions.

2. Shame.—Appeals should be made to the sense of shame. It is powerful with many, but not all. It depends for its value on the sensitiveness of the pupil, and class opinion. It is not suited to great offences, and so generally is useful only for first offenders. Iteration weakens it.

3. Detention.—The stopping of play and loss of liberty are very irritating to children. Hence detention should be used for great and habit offences like riotous behaviour and unpunctuality. Bain thinks it a bad form of punishment.

4. Pleasure.—The deprivation of some object of pleasure is a good form of punishment where applicable. There is another application of this punishment which is recommended by Locke. Take the offence itself and dose the offender until he is salted with it.

5. Impositions.—Here the pain lies in the weariness produced. There is also the irksomeness of confinement. They might be used for neglect of lessons, for unpunctuality, and for disobedience. But there is a strong division of opinion about their value. It is asserted, with some truth, that they create a distaste for school work, and so while checking one evil they produce another. By some they are even considered barbarous.

6. Marks.—The giving of bad marks may be useful, especially if it is possible to erase them by subsequent good conduct.

7. Corporal Punishment.—See Section VII.

8. Expulsion.—This should be a last resource. Its failing is that it is not always available in an elementary school.

VI. Objectionable Forms of Punishment.—Such punishments as a box on the ear, blows on the head or face, pulling the hair, pinching the ears, rapping knuckles, standing on one leg, crucifixion (standing with extended arms), impositions (according to some people), should all be strictly avoided. The dark room and the cupboard are barbarous and dangerous punishments. The fool's cap, the label, or the sandwich boards degrade the pupil in the estimation of his fellows, and often harden the culprit himself.

VII. Corporal Punishment.—This is the most vexing form of this most vexed question of school management. Opinions on it are so conflicting, that any pronounced opinion is sure to offend some people. But our best educational authorities consider there are times when it is necessary, and when it would be a mistake not to use it.

Objections to Corporal Punishment.—John Locke gives the following objections to its use:—

- (1) There is in us a natural propensity to indulge in corporeal and present pleasure. This wants rooting out. But corporal punishment strengthens the propensity by appealing to it. A child who abstains from any act through fear of corporal punishment only prefers a greater corporeal pleasure, or avoids a greater corporeal pain.
- (2) By association, it breeds aversion to that for which it is the teacher's business to create a liking.
- (3) It is a slavish discipline, and makes a slavish temper.
- (4) It often—in severe cases—brings a worse and more dangerous disease, by *breaking the mind*. Instead of a disorderly boy you get a low-spirited, moping boy.

VIII. Young Teachers and Corporal Punishment.—Young teachers should be restricted from the use of corporal punishment, both for their own sake, and for the sake of their scholars.

For the Scholar's Sake.	For the Teacher's Sake.
<ol style="list-style-type: none"> 1. The infliction of corporal punishment is the most difficult and the most unpleasant part of a teacher's work; and, therefore, for the sake of the scholars, it ought to be inflicted only by those presumably most fit to do this delicate work. 2. Scholars are more ready to admit its justice from an older or principal teacher. 3. There is apt to be in young teachers: <ol style="list-style-type: none"> (a) More zeal than discretion; (b) More feeling than judgment; (c) More energy than sympathy; and, as a result, the children may be punished unjustly. 4. It tends to harden and demoralise, and not to elevate. 5. It checks the will without disciplining it, and so makes the scholar less fit for work. 	<ol style="list-style-type: none"> 1. The work is so unpleasant that young teachers should rather avoid than seek it. 2. Generally, it is against the opinion of School Boards, the public, the parents, the press, and the magistrates; and an antagonism to so many authorities, and its consequent risks, is too big a price to pay for the authority in question. 3. It breeds bad feeling between pupils and teachers, and so discounts the efficiency of the work. 4. It often breeds insubordination when inflicted by a young teacher. 5. Punishment, for the most part, is negative in its effects. It weakens vital force, and so discounts work. It deters rather than excites to activity.

REWARDS.

I. Principles underlying their Use.—1. A child should do its lessons and behave itself properly from a sense of duty; but, unfortunately, the sense of duty is weak in a child, and has to be cultivated. For the adequate accomplishment of our duty a moral impulse is at least occasionally necessary. But a moral impulse involves a moral sense, and here again we find children lacking. The cultivation of a proper moral sense is the great aim of school education on its moral side, and this is the work of years. Then, as the motives are weak, some inducements to right conduct must be held out to children: hence the necessity for rewards. The natural appetite of a healthy child is for play, and as all work cannot be made play, then rewards become necessary as an inducement.

2. But the proper bestowal of rewards involves the exercise of wisdom and justice. When to bestow them, why they are bestowed, and the amount to be bestowed, are three problems difficult to solve in some cases. Their moral effect must not be wasted or lost. The ground on which they are given is all-important. Effort and industry should be encouraged rather than intellectual ability; moral work, rather than mental merit.

3. Rewards should not be too freely bestowed in the early stages of child life, for that is the period for developing the social sentiments, and emulation or rivalry is an anti-social emotion.

II. Rewards as Inducements to Work.—1.—They are an incentive to work, because they appeal to the *love of gain*, the love of approbation, the love of power, and *kindred emotions*. The risk attached to them is that they are apt to be looked upon as an end rather than as means.

2. They are a means of interesting the *parents* in the progress of their children.

3. They incite to *obedience*, and so strengthen the formation of *good habits*.

4. They often raise the successful pupils in their own and the estimation of the other pupils. They thus breed *respect*, which may be valued more than the reward itself.

5. They set up a pleasant and profitable *association* between industry and the best form of rewards.

6. They make a powerful appeal to *emulation*; and the desire of surpassing others, of gaining distinction, of acquiring fame, is the *most powerful* known stimulant to intellectual work.

7. Rewards bestow *pleasure*, and pleasure is one of the most powerful of motives.

8. Rewards are *positive* in their effects; punishments are negative: hence they are a better weapon than punishments.

III. School Rewards.

1. **Place Taking.**—This appeals powerfully to emulation.

2. **Decorations.**—These are of a simple character.

3. **School Privileges.**—These include such things as the right to occupy certain places, to fill certain *offices* like that of *monitors, curators, librarians* of the school library, the marking of certain forms of school work, etc.

4. **Prizes.**—These can take the form of *books, certificates, medals, and scholarships*. Their effect varies. They often stimulate rivalry, which is an anti-social feeling; or they may call forth the best of the social emotions—love for parents, respect or love for the teacher, and the consequent desire to give the loved or respected ones pleasure by the gaining of a prize. They often have a wider effect. There is the bitter feeling of disappointment in the less successful scholars, which may harden into indifference and a subsequent lack of effort, or there is the arousing of jealousies, envy, and a sense of injustice. A failure, rightly utilised, should become a further stimulus to success.

5. **Esteem, Praise.**—These are very powerful incentives to the mind, but they must be used judiciously to be effective. A pleasant association grows up between right conduct and praise; and later, the right conduct becomes a habit, and sufficiently strong to exist independently of the association.

GOOD MANNERS.

Good manners are a matter of breeding or habit, hence any efforts in the direction of good manners must go through habit. If home influences are antagonistic, the task is rendered more difficult; but this difficulty ought to stimulate to greater effort.

1. **Imitation.**—The imitative faculty is strong in children, hence the teacher should always be well mannered before his pupils. He should see that they are well mannered to him and to each other, and both should be well mannered to visitors and officials, and in their private life. The better mannered boys might be held up as an example to the rest. This could be done in many ways without obtruding such pupils directly on the notice of their fellows.

2. **Their Importance.**—The teacher should make his class thoroughly understand the importance he attaches to good manners. There is a tendency too often to think too much of intellectual excellence, and to take excellence in bearing as a matter of course. If the class once understands that the teacher attaches as much importance to good manners as to good scholarship, the improvement will be rapid and wide.

3. **Rewards.**—These should be given for conduct as well as for ability. Good manners form a large element in conduct, and their cultivation will thus be encouraged. Rewards should not only go to the clever. Remember that education is moral as well as mental.

4. **Good Company.**—This is another opportunity for imitation. Take the children into good company whenever possible. Let them mingle with and see the manners of better bred people than themselves.

5. **Self Respect.**—Inculcate a feeling of proper self-respect. Do not let there be too much humility, or hypocrisy or bashfulness will be the result, and both are ill-bred. But encourage such a feeling as will prevent any slight or disrespect in their manner to any one. A person who respects himself usually shows some respect to other people.

6. **Cultivate their Dispositions.**—Quickly and continuously cultivate their dispositions, seeking to produce such a disposition as will make them very

reluctant to offend any one ; and then aid them to show that disposition in the most agreeable way possible. In this way they will gradually become quiet and refined in their general bearing. Especially will a well-bred person seek to avoid making any one uneasy in conversation.

7. Good Literature.—Place good literature in their way. Let them read of cultured and refined people ; imbibe cultured and refined thoughts ; and the mellowing influence of such agencies, though probably slow in operation, will certainly bear fruit by improving their manners.

ANGER.

I. Causes.—Anger may be aroused by any number of specific causes, such as an injury, real or supposed ; unfair or capricious treatment, unnatural restraints of discipline, physical pain, spite, envy, or jealousy. But all these specific causes range themselves easily under one generic head—*the sense of injury*.

II. Treatment.—Its treatment is difficult. The angry child is both physically and mentally disturbed. If the anger is excessive, the action of the heart is impeded, and the face turns pale. The digestive and other functions naturally suffer from the withdrawal of blood and nervous power. Or the excessive activity of the system engendered by anger may cause the face to redden, the veins to distend, and the action of the heart to quicken. This rousing of activity is characteristic of rage, and the child is in a very excitable condition altogether.

The child is equally disturbed mentally. There is a shock of pain which discomposes the system ; a deep rankling pain, which wants to retaliate ; a state of feeling, which turns the pain to joy if the retaliation is successfully effected.

A little knowledge of this sort shows the teacher the difficulty of his task. The child is in no fit state for argument or punishment. The first effort must be to soothe the child, and to restore him to something like a normal physical and mental condition. This will depend largely upon the temperament of the child, and the nature of the provocation. An unintended injury is easily satisfied, but injury done designedly is not so easily removed.

- (1) Bearing these facts in mind *at a subsequent period*, when anger has decreased or disappeared, the teacher might make some effort to strengthen the child against any similar outbreak. If any *immediate action* is taken at all, it should take one of two forms :—
 - (1) The voluntary self-humiliation of the wrongdoer.
 - (2) A compulsory humiliation inflicted upon the wrongdoer. Bain assures us that both of these are found to answer their end.
- (2) Later on the teacher might point out the dreadful effects of anger. He might show how it exhausts the energy ; gives pain and annoyance to others ; makes enemies ; and brings dislike and distrust. Angry people are wisely shunned.
- (3) He should appeal to the class to *bear and forbear* ; to avoid anything likely to provoke to anger.

- (4) He should seek to cultivate the *reflective powers* of the child, and this will give him a healthier view of the irritating causes.
- (5) Where possible he should trust to the *discipline of consequences*, for anger often brings its own punishment.
- (6) Where it leads to acts of *deliberate cruelty* it must be checked, even at the expense of considerable severity.
- (7) He should *appeal to the child's will*, and make him understand that he should be the master, not the slave of his passions. He might also gently remind him that public opinion considers anger to be short madness.
- (8) Perhaps the best method of all will be to *cultivate the social feelings*; to appeal to the higher side of the child's nature.

OBSTINACY.

This is a fearful fault of temper in children, and one especially hard to deal with. Its treatment should depend upon its cause, and will often differ. Its detection is not always easy, for there may be states of mind which may be mistaken for it. We will first of all deal with those.

I. Mistaken Obstinance.

1. Stupidity.—This is often mistaken for obstinance by inexperienced or careless teachers. The natural obtuseness which keeps a child dumb when questioned, the lack of intellect which handicaps him in the right interpretation of work and rule, and often the consciousness of his own stupidity, are factors giving a product which wears the garb of obstinance.

2. Physical Weakness.—This may not allow a child the necessary strength or energy for the proper performance of school duties. There is a shrinking from the censure expected or received; a sort of passive suffering, lacking the necessary strength-fed courage. But it is not obstinance. It is not a fault of temper, but of constitution.

3. Fear.—Here the pupil will be in an extreme state of misery and depression. All the activities are prostrated, and as a result the child will be afflicted with exaggerated ideas in all matters associated with this emotion. Remember the pain of fear is double, the present pain being augmented by a prospect of future pain, increased by uncertainty. It is a most destructive feeling. It wastes the energy of the child and scatters his thoughts, and consequently it is a great hindrance to progress. Generally it paralyses effort, and this is mistaken for obstinance.

4. Treatment.—In all these cases there is no voluntary resistance, but constitutional defects, and punishment is unwise and unjust. The child does not require correction, but assistance; not severity, but sympathetic patience.

II. Real Obstinance.

—This may originate in several ways.

1. The Teacher.—Harshness in manner and treatment; a querulous nature with its chronic fault-finding; the sneer, sarcasm, or other mode of irritating language; demanding too much of the pupil, and meeting failure with punishment—all these are provocative of real obstinance.

2. Fitful Obstinance.—Here the obstinance is a fluctuating and uncertain quantity. Its cause may be any of those specified, but its uncertainty is its chief characteristic. Wounded vanity is often the guilty agent.

3. Vicious Obstinance.—This is a bad fault of temper, and is generally indicative of a low moral tone, or of a strong development of the anti-social emotions. The pupil deliberately defies authority, makes himself a nuisance, and often becomes a force by the mere nature of his objectionableness.

4. Treatment.

(a) Here the fault lies with the teacher, and the remedy also. Let him improve himself, and the evil will disappear.

- (b) In the second case an effort must be made to turn the sympathy of the class against the boy. This being done, the boy is attacked in his most vulnerable point. In extreme cases, separation from his school-fellows or expulsion may be used.
- (c) There is some division of opinion among our best authorities as to the proper treatment in the third case, but there are certain recommendations common to all.
 - (1) Do not let the boy think you mistrust him.
 - (2) The teacher must be firm, unruffled, and reasonable. No personal motive must be present.
 - (3) Avoid a contest with the boy if possible; but if you enter upon it you *must* win.
 - (4) Enlist the sympathies of his fellows against him.
 - (5) Most authorities consider this a fit case for corporal punishment, but only use it in extreme cases. Separation and reflection may render it unnecessary.
 - (6) Victory must be followed by gravity and kindness.
 - (7) Incurable cases must be expelled.

CRYING.—According to Locke, there are two kinds of crying:—

1. Stubborn and Domineering.—This kind of crying is a striving for mastery. Children want their own way, and as they have not the power to obtain their desire, they will by their clamour and sobbing maintain their right to cry. If you permit this kind of crying, you merely encourage the child's unreasonable desires.

Try persuasion at first, or divert their attention, or give them a little good-humoured banter. But the circumstances of the case and the child's temper must be considered. If these fail, use severity; for where a look or command will not do it, corporal punishment must, for it is nothing but obstinacy. The will must be bent, for there the fault lies. It may involve a contest, and, unless the crying is stopped, or its nature changed, then the whipping has been useless. Hence each case must be guided by its own circumstances.

2. Sorrow or Pain.—This kind of crying can be easily distinguished from the former. Crying is the first and natural way for children to declare their sufferings or wants; and this needs to be remembered, especially in infant departments. But where it is passing into a habit it should be stopped. Gentle means will suffice. Children should be taught to bear physical pain or disappointment without crying. When they suffer little knocks and bruises through heedlessness, it is not pity they want but caution. Locke even suggests that we should bid them do it again. His great idea is to harden children. He says they should have no tenderness but what rises from an ingenuous shame and a quick sense of reputation.

CRUELTY.

1. Natural Tendency.—There is a natural tendency in some children to cruelty. The sympathies and affections of children are often but little developed in character, and where the contrary passions are unusually strong, pure malevolence bestows intense pleasure. Cruelty may arise from thoughtlessness or ignorance, as when a boy tortures a fly; but every teacher of any experience knows that there are natures prone to voluntary cruelty. The character is often illustrated in literature—the Quilp of Dickens being a well-known instance. The anti-social feelings are strong in children, and cruelty is a development arising from them. A child is fond of domineering. The checking of this arouses antagonism. He resents injuries, real or supposed, and shows his resentment by striking other children. Nor is cruelty confined to physical pain only. We are early taught to hurt nobody by *word* or deed. The tongue, or a line of conduct painful to those who love us, are other familiar instances.

Cruel children may make cruel adults, hence cruelty should always be checked. Our legal practice takes notice of the associative power of cruel

actions by excluding butchers from juries on life and death cases. Children should be bred up in abhorrence of cruelty, and taught that nothing should be spoiled or destroyed but for the sake of something better.

2. Habit and Custom.—These often engender cruelty. Harsh laws, whether in the home or school, do this. Many foolish parents whip their children for everything. Some teachers are too prone to the use of the cane. The teacher, by his own example, and by a kind and judicious rule, can do something to check this.

3. History.—There is often a large element of fighting and killing in history. Honour and renown fall more readily upon conquerors than upon others. The press and literature of the country sometimes aid in the same way. As a check to this the teacher should make a wise selection of reading matter, and his history lessons might be regulated for the same purpose.

4. Games.—Some of our games which, rightly played and under a right discipline, are checks to cruelty, may be, and often are, abused instead of used. They may become mere channels for cruelty. Games must be encouraged, but the teacher must strive to regulate and discipline them.

5. Animals.—Cruelty often shows itself in the treatment of animals. A few natural history lessons, given with kindness as an aim, would check this. To cure cruelty is difficult, and often slow. Fighting, fagging, bullying, and tyrannising are common school forms of it. A hatred for all forms must be implanted. Sound principles of religion and morality will aid to check it, and the teacher must practise kindness both in word and deed.

6. Harshness.—"As is the teacher such is the child," is a scholastic truism within reasonable limits. The plastic nature of children is easily moulded for good or evil. Perhaps the teacher's character is the greatest influence bearing upon the children in this respect. It is useless to preach kindness and practise harshness. If children are to grow up with happy and cheerful tempers, then one important essential is that the teacher should be of a happy and cheerful temperament. Harshness is often the attendant of impatience. But a teacher must be patient, because the best results of his work are slow to show themselves. A bad temper is a source of perpetual irritation and misery in school. "A boy compelled for 5½ hours a day to see the countenance and hear the voice of a fretful, unkind, hard, or passionate man, is placed in a school of vice" (Fitch).

KINDNESS.

1. Its Scope.—Kindness is another name for benevolence, and some authorities assert that benevolence includes all the virtues. The ideal to aim at is to love your neighbour as yourself. It includes an internal factor—the cultivation of the affections in oneself; and an external factor—the promotion of happiness in others.

2. Its Cultivation.—The teacher must practise benevolence. He must do deeds of kindness, for affection is shown in good actions. He must also teach the children to show kindness to each other. His discipline must be gentle, firm, considerate, and even generous. He must nevertheless be just before being generous, for the special function of kindness only begins where justice ends. The pupil should also be taught that he owes slight services to his fellows; *i.e.*, he should be "obliging". Any little service which can be done without inconvenience may be mutually demanded. Finally, he should cultivate sympathy, which is something more than general benevolence.

COWARDICE.

Cowardice is one of the results of fear, and it has in it an element of meanness. It produces a general depression of tone; and mental depression, however arising, is exaggerated distrust of good and anticipation of evil. The susceptibility to fear in the

young, to a certain extent, may be a nervous property; but the teacher must remember that there are certain temperaments, like the passive and susceptible, which are prone to it. Its cure should be sought through its *causes*. An effort should be made to discover these and to remove them.

1. Frights.—Keep the children free from all kinds of frights. Bogey stories, ghosts, etc., should be abstained from by those who have to deal with young children. A fright may leave a permanent injurious effect. Punishments, especially when they are excessive or capricious, often produce frights. Shutting children in cupboards, and locking them in dark rooms, are also some causes of frights. Violent threats and outbursts of temper are others. Avoid all.

2. Ignorance.—This is a fertile source of fear, and is very productive of cowardice in weak minds. Knowledge is the remedy. Perhaps no grander result is accruing from the general teaching of science than the disappearance day by day of those bits of superstition which often terrified the people and fed a feeling of cowardice. Uncertainty is a species of ignorance, and is thus sometimes productive of fear or cowardice. Here the teacher should try to work through its counteractive, and to cultivate a feeling of composure or coolness in the presence of danger, real or fancied. The pupils should be taught to get a measured estimate of the danger, and then to make a sufficient effort to overcome it.

3. Ill-Health.—Cowardice may frequently arise from a weak body, and here it might more justly be called something else. Such cases require kindness, sympathy, and forbearance. The best remedies are beyond the teacher's reach, for they include good or improved conditions of life. But a certain amount of familiarity with, and a knowledge of the objects feared may be beneficial.

4. Association.—Cowardice may arise by association. To check or cure it, form new associations of a stronger and conflicting character. Divert their thoughts, and mix pleasant things with the diversion.

5. Moral Cowardice.—Here the moral sense is weak, and needs cultivation. The higher emotions must be developed, and this will be a slow process. There is a weakness of motive, both in duty and in prudence. The cure is to give the child new motives. Withhold him from all strong temptations. It often arises also from weak intellect. "Please, sir, I couldn't help it," is a common excuse; and here the pupil pleads his moral weakness in extenuation of his offence. Some punishment must be given, so that he may act differently when the same conditions again arise.

6. Heredity.—A family, like a nation, may be cowardly by nature. The process of cure is perhaps the hardest and slowest of all.

Obedience.

There can be no school without government, and no government without obedience. Obedience is a habit, and an important one both for the individual and the State. It is not easy in its first stages with some children, as it involves the submission of their own will to that of another. The child has to learn to control its own will, and this control is a resultant of several components. It has to learn to respond to the word of command, to imitate movements at sight, to act on a wish. There are several kinds of obedience, the best of which is cheerful and willing. The motives are the index of the kind,

1. Slave Obedience.—This is such obedience as a slave gives to a master; a dog to a whip; a horse to a spur; a child to the cane. The motive is weak, for it generally springs from a hope of favours to come, or from fear of some punishment. It manufactures a fair proportion of hypocrites.

2. Military Obedience.—This is the obedience of habit. There is no why or wherefore offered. The obedience is demanded, and it has to be given. It is a prompt species of obedience, brought about by a perfection of drill. Repetition fixes it. There is no cruelty necessarily attached to it; no fear. It is a matter of habit pure and simple, such as one sees in the army, navy, and certain schools. It is pleasing to look at because of its smartness, and is apt to impress the martinet official favourably. It is always mechanical, and generally unsympathetic. Its failing is that it leaves the character weak, and the child is launched into the world subject to all the dangers which threaten a weak will.

3. Cheerful Obedience.—This implies respect on the part of the pupils for the teacher, and it is obtained by a skilful use of natural principles. *Affection* is called to aid, for a child obeys willingly where it loves. Then, in a kind manner, it takes advantage of the *sense of dependence* in children, which arises from their ignorance and weakness. These failings produce a disposition to obey which the teacher skilfully uses. It also recognises the force of *sympathy*. Children are very much like sheep in this respect, for one does pretty much the same as all the others. Hence, a word of command, since it appeals to the majority, appeals to all, and so we find the will freely submitted to the authority of others without becoming weak. The will is in harmony with right, and an association has been set up which shows that the obedience springs from virtue, and not from habit only, or from fear. *Authority* is invoked, for the teacher is *in loco parentis*, and must prove himself as much the friend of the scholar as the parent. The obedience is claimed on the ground that it is right to yield it.

The *personal equation* is also a great aid. By this is meant an aggregate of qualities and habits (qualities mental and moral) possessed by the teacher, and differing in quantity or quality, or both, in most teachers. It is a characteristic attribute which obtains for some men the title of "born to command," and among teachers the reputation of being "a born teacher".

A healthy *school opinion* is another great aid to cheerful obedience, and the teacher should cultivate it. If the school rules are just, the children will sympathise with them, and the co-operation of the parents will be ensured. The reputation of the school should be placed in the hands of the scholars, and their pride and sense of responsibility will be thereby increased. Their respect will thus be obtained, and prompt and cheerful obedience will be the result. *School games* might also be made an auxiliary for this purpose. They afford the teacher many excellent opportunities of establishing that relation between him and the scholars which is so much desired. The efficacy of *rewards and punishments* as tending towards the same end has already been shown.

INATTENTION.

Inattention is often the fault of the teacher, and especially of young teachers. To fix and maintain the attention there are certain laws of the mind which must be obeyed, and any violation of these laws is sure to be followed by more or less inattention. There is no guiding the young without this power of concentration.

Conditions of Attention.

1. The Will.—The will is the chief influence, and the chief stimuli of the will are pleasure and pain. But it must be remembered that the will itself is a growth, so that the voluntary attention of a child may not be great. Concentration is weak in children,

2. Pleasurable.—The teaching must be made pleasurable by the use of natural methods and by a pleasing manner. Pleasure supports the cause that brings it, and so the whole strength of the mind is ensured. Do not make the pleasure too great, or it will defeat its own object. *Novelty* is an aid.

3. Physical Conditions.—See that the physical or material surroundings of the children are comfortable; that they are well seated, out of draughts, glare, etc. Mental concentration can hardly be expected where there is physical discomfort.

4. Suitability of Work.—The work should be suitable. It must be within the compass of the children, and adapted to their growing powers and likings. The lesson should make use of child activity, observation, and curiosity. With older scholars the higher faculties should be worked.

5. Assistance.—A fair amount of assistance should always be given, and the child's mind should not be kept bent too long upon the same subject. You may force the attention, but it is wearying and unprofitable. There should be proper changes of work. The physical should follow the mental; or the mechanical might dovetail the mental. Singing, drill, and writing are good changes following on the heavier lessons like arithmetic and grammar.

6. Obstacles.—Remove all distractions, such as sitting near an open window overlooking a street, or the proximity of some class at a noisy lesson, interruptions, outbursts of temper or disorder, and all kindred obstacles.

7. Punishment.—An injudicious use of punishment is a great hindrance to the maintenance of real attention. The child is thrown into a strong and antagonistic emotional state. In a depressed and subdued child the appearance of attention is not worth much.

LAZINESS.

Relatively, few people in this climate are lazy, for climatic influences are against idleness. Public opinion condemns it, and necessity conflicts with it. The supposedly idle work, and some of them very hard. But laziness is used here in a limited sense. It is the refusal to perform, or the ill-performed task, which is called idleness. Of course, every teacher will meet with a few exceptional cases, where the children are "bone" lazy, and often some physical or constitutional cause will be found for this. The treatment of laziness will vary with its origin.

I. Constitutional Laziness.

1. Health.—This may be the result of weak or delicate health, and in such cases it should be kindly dealt with. The tasks are too much for the pupil, and should be lightened.

2. Teacher.—It may spring from the teacher. Ignorance or indifference to the elementary principles of child life will generate laziness. There must be a natural application of the force which nature has supplied—child activity. If the task set does not make much demand upon this activity, there is a tendency to despise and reject it.

3. Natural Aptitudes.—The same may be said of the neglect of natural aptitudes. They are strong in children, and need careful regulation. The child will neglect the set task to indulge in his beloved pursuit. Watch him, see what it is, and give him a surfeit of it. This is Locke's recommendation. Keep him hard at work on something, so as to form the *habit* of industry—the something of his choice which has proved the disturbing factor. He will weary of it, and return to his set task with relief.

II. Habit Laziness.—An indolent disposition is not always the result of constitutional weakness. It may also be formed by

habit, and the habit must be checked before it passes beyond treatment. It is easier to bend the pliant twig than the hardened stem.

1. Kindness.—A little kind conversation may be sufficient. The boy may respond to the interest thus kindly shown in him. The desire to please a kind teacher may prove a stronger motive than the desire to idle. His self-regard should also be appealed to. He should be made to understand that *he* is the actual loser by his idleness, by pointing out his present and prospective losses. The prospective losses are generally too distant in time to appeal to children, but their conjunction may strengthen the appeal to his present losses.

2. Shame.—If kindness fails, then try a little good-natured banter. Let there be no feeling of vindictiveness in your tone or manner, but let the child understand that he has sunk in your estimation and that of the class.

3. Punishment.—This should be used with care, for it is fatal to success to set up unpleasant associations. Neglected work may be done in playtime, or impositions may be given where they can be done honestly, and without making much demand upon the teacher's own time. Only in such cases as those in which it assumes an obstinate form should corporal punishment be used, and it may be said of punishment generally that it is often expensive and deceptive in cases of idleness.

STUPIDITY.—This may be a gift from the parents or the teacher.

1. When Bestowed by the Parents.—When nature is responsible there is nothing for it but patience and kindness. The ordinary school curriculum does not suit such children, nor should they be placed under it. The London School Board has humanely recognised this fact by providing a special curriculum and central classes for such children. The school and its work want to be made especially attractive, and the teaching requires to be very largely composed of kindergarten, hand and eye training, and simple object lessons. Under no conditions should these children be forced, for the intellectual wealth of a country lies in the cultivation of its ability, and not in the forcing of its mediocrity.

2. When bestowed by the Teacher.—The child may be *badly classified*, and this may breed stupidity from lack of apprehension. The teacher may be *unmethodical*, or *not properly acquainted with his subject*. He may be *careless* or *inaccurate* in describing or informing, or in the correction of exercises. Or there may be a *lack of illustration and experiment*. He may be *harsh* or *cruel* in his manner, and so chill or freeze the efforts of the timid, the weak, or the shy. His *questions* may be badly framed, badly put, and put at the wrong time, and there may be no skill in dealing with the *answers* given. And generally there may be too much ignorance of the elementary laws of the mind to deal with its training efficiently.

TRUTHFULNESS.

This is a wide term, including as it does not only accuracy in obtaining and stating facts, but sincerity, candour, ingenuousness, uprightness, respect for the property of others and for their own; honesty in speech and time, as well as in money or goods. Lying will sometimes supplant it, and it must be the constant effort of the teacher to check the one and to cultivate the other. To grapple with untruth, seek out its causes, and deal with them.

1. Causes of Untruth.—These may be various.

1. **Cowardice** (fear).—There may be a desire to evade some punishment, to shirk some pain. It is a ready and apparently cheap cover for any fault.

2. **Gain**.—It may be to secure some gain, to favour some cheating transaction, to remove some obstacle, to win some contest.

3. **Weakness**.—It may spring from weakness, either physical, mental, or moral. The physical weakling may fear physical pain; the moral weakling may be the product of surrounding circumstances; the mental weakling is a species of fool, and is generally to be pitied.

4. **Vanity**.—With older pupils it may arise from vanity. A lively and fertile imagination is drawn upon for facts to establish the fame of the offender for some point of excellence. There is such an overweening opinion of self, such unbounded belief in one's own worth and capacity, that the fancied potentialities of the individual are dished up as actual occurrences. But in such cases memory is generally weaker than imagination, and these flights of fancy are sure to stand self-revealed sooner or later.

5. **Malevolence**.—There may be a desire for revenge; to hurt by word; to break the ninth commandment, so that they may break the eighth.

II. Treatment.—The teacher must look beyond the act itself, and deal with the *motive*. He should aim to implant the principles of honesty in the disposition, rather than to prohibit certain acts. He should on the first occasion seem *surprised*, and gently reprove with an appearance of sorrow. If this be insufficient, *rebuke* the child, and show yourself very much displeased. There should be a *removal of confidence*, which should only be gradually restored after penitence has proved its genuineness by rigid truthfulness. The *penalties* attaching to lying should be placed before the child. People shun, distrust, and despise a liar. No one will knowingly employ him, and no good people will willingly associate with him. *Shame* and *contempt* can and should be shown if necessary. Lying should always be spoken of with detestation, as a quality totally inconsistent with the character of an honest man. The *religious* aspect of the question must be pointed out and enforced—the Bible is fertile in punishments following on this vice. The *social necessity for truth* should be explained, to the older scholars at least. The whole fabric of society and the credit of nations depend upon the sentiment of truth. Finally, the teacher's own *example* must be all that is demanded of the pupils, or they will readily see that he is seeking to force a commodity upon them which finds no favour with himself.

Honesty.—This is a wider term than truthfulness. It will include all that is there expressed, and something more. It will embrace the full teachings of the eighth and ninth commandments. It forbids hands to pick or steal, or tongues to bear false witness. It includes the right use of school property, the scholar's clothes, books and playthings; the right place in class; the honest production of work; and it excludes all copying, prevarication, or hybrid

truths. It rejects the *suppressio veri*, the *suggestio falsi*, some forms of diplomacy, much business "cleverness," and any transactions where advantage overrides justice. Its treatment will be similar to that adopted for truthfulness, with the addition that wherever actual theft has occurred, compensation or restoration should be insisted on where possible.

Tale-telling.—A clear distinction may be drawn between this and untruthfulness. *The motive is different.* In the one case the motive is bad, in the other it may or may not be good. The tale may be truth—and something more. It is a vice in the clothing of a virtue. There is an appearance of virtue in the apparent desire to check some breach of discipline or morals: but this may be subservient to the desire to inflict pain; to seek revenge; to indulge in spite. Or it may include the element of toadyism; the desire to curry favour. This should be checked, but treated tenderly. So far as it is a desire to please, the motive is good, but weak. Divert it into healthier channels, and try to strengthen it.

COPYING.

I. Its Sources.—Children may copy because they do not know how to do the work set them. This *ignorance* may or may not be the fault of the teacher, but it will be his business to discover and remove it. It may arise from *idleness* or *indifference*, and a reluctance to make the requisite mental effort at the time of the test or other exercise; or there may have been persistent idleness, which may have escaped the notice or may have been beyond the capacity of the teacher to deal with. Where *inattention* is the cause, there is a sense of guilt. The child does not know that which might be reasonably expected of him, fears the consequence of his offence, and so falls a victim to this form of dishonesty. Nervousness, or shyness, or *physical weakness*, may handicap a boy when the explanation is being made to the class, or the information given. The power of *concentration* may be too weak to meet the demand involved by some lessons. Worse than all is the case in which the *moral tone* is bad, and of which copying is merely one evidence.

II. Its Treatment.—The following are some of the *means* at the teacher's disposal for the prevention of copying:—

1. Mechanical Means.—Copying should be made practically impossible by the arrangement of the classes and pupils. Where possible they should be widely spaced, and sharp supervision should be maintained, and different examples should be given to different pupils. Any facility for copying left

within the reach of a pupil, and especially a young pupil, is a piece of cruel injustice. The moral sense of many children is not highly developed, and it should be the teacher's function to see that no undue strain should be placed upon it at this stage of its growth.

2. The Teacher.—The teacher himself may be a cause of copying. If the child copies from *ignorance*, the cause may be insufficient help from the teacher; if from *idleness*, the teacher may be somewhat to blame for the growth and strengthening of the habit; if from *inattention*, the teacher may again be to blame, for either his supervision is weak, or his methods of teaching may be bad, or both causes may operate. Where *nervousness* or *shyness* are the agents, no efforts may have been made to reduce or remove these inflections. Where the *moral sense* is weak, the teacher must see that there is nothing in his observed life which may offer the least encouragement to deceit. The teacher who cannot be uniformly trusted in the absence of his superior is soon measured and estimated at his proper worth by the class; and he must not be surprised if some weak or vicious member of the class should copy him as well as his neighbour's lessons.

3. Moral Means.—A sound moral tone is the best antidote to copying. Cultivate this; live up to it; place the honour of the class in the hands of the pupils themselves; foster a pride in maintaining it; give proper assistance in every case; make the most suitable arrangements to reduce the temptation; and then there will be but little fear of copying.

UNPUNCTUALITY.

I. Its Causes.—These must be carefully ascertained, and dealt with separately. The causes may be various, requiring different treatment; but the majority of cases will be traced to accident, habit, indifference, or some form of temptation.

1. Accident.—Here it should be overlooked. If the accidents become too numerous, it then passes into carelessness, and verges upon the second cause—habit.

2. Habit.—This may arise from laziness, or dilatoriness, and in such cases play should be stopped, and some task set whilst the others are at play. If the habit persists, shame might be used; and, as a last resource, corporal punishment or expulsion should be tried, for then it has become sheer obstinacy, or chronic disobedience.

3. Indifference.—Some children do not care whether they are punctual or not, and in such cases the moral sense is generally weak. The evil effects of this habit upon the child's future prospects might be pointed out. No one will continue to employ an unpunctual person. If the indifference passes into habit, in so far as it produces the same results it should be treated in the same way.

4. Temptation.—The appearance of some local show, regatta, race, circus, etc., or the influence of some evil companion, may cause occasional backslidings. Do not punish such cases, but appeal to the boy's better nature. Urge him to cultivate good habits and a stronger sense of duty. Show him that to withstand such occasional temptations he will require some moral courage, and urge him to show his better nature by making the effort.

II. To Ensure Punctuality.—The general means usually adopted to ensure punctuality are as follows:—

1. Registration.—Give each child a red mark who is punctual, and each late child a black mark. Apart from other considerations, a pride in scoring the creditable red marks is sufficient stimulus for many. At the end of the quarter a summary of attendances, punctual and unpunctual, should be sent to the parents, and an appeal made for their co-operation.

2. Prizes, Rewards.—All the various forms of rewards may be brought into use. A system of tangible rewards should be adopted. 95 per cent. of regular and punctual attendances might entitle to a quarterly card. Two quarterly cards might be exchanged for a prize (a book); whilst 100 per cent. of regular and punctual attendances might entitle to a bronze medal. A continuation of such excellent attendance and punctuality might entitle to a silver medal. This is practically the system adopted by the London School Board. The practice of awarding a card weekly for 10 punctual attendances may or may not be adopted. Much can be said both for and against it.

3. Moral Means.— } Both of these have been dealt with above under the
4. Punitive Means.— } head of "Sources".

TRUANCY.

I. Its Causes.

1. Restraint.—School life is a great restraint to some children. They naturally love their freedom, and view the school as an infringement of their liberty. Freedom is a pleasurable release from restraint, and the pursuit of pleasure is one of the strongest motives in humanity. Such children are acutely sensible to the coercion of the school, especially when they are children of great natural energy. The restraints of school discipline are prohibitions of pleasure.

2. Parents.—An ill-regulated, ill-disciplined, or immoral home will often produce truants. Self-indulgent parents, with a weak sense of duty, and over-indulgent parents, can hardly expect a sense of duty to be developed in their children. The training of the will is neglected or misdirected. The result is a tendency in their children to seek their own pleasures in their own way and at their own time. Unrestrained at home, they will not willingly face the restraint of a school. Nor is this the whole of the parental influence. Heredity may be a factor in truancy. The love of roving, the hatred of discipline, may be born in the child, and local circumstances may be unfortunate enough to develop them.

3. Children.—The influence of child on child, the sharp over the dull, the strong over the weak, the great over the small, may show itself in truancy. The strong and domineering boy, prone to truancy, is sure to be a centre of truancy. The passionate boy, with strong appetites, the weak, the easy going, the restless, the fickle, the lazy, the school haters, the rovers, the impulsive, the self-pleasing, all may be led away by mutual influence, by a fine day, a local show, or a local race.

4. Teacher.—An objectionable teacher produces truancy. Harshness, cruelty, irritability, injustice, carelessness, or incompetency may produce it. Perhaps cruelty is as productive of truancy as any cause. A lack of sympathy on the part of the teacher, the feeling that the boy's position in the class is a degrading one, or one to be derided, the constant wounding of the child's self-love and self-esteem are all possible causes.

5. Managers.—The increasing demands of the Education Department are making truancy from this source more and more impossible. But managers who maintain schools in old, dull, ill-lighted, ill-ventilated, and often ill-placed rooms, with a minimum staff, with the poorest and a minimum quantity of apparatus, must not be surprised if some truancy is laid at their doors. Children will not willingly seek such a gloomy, unhealthy life. Some will play the truant first.

II. Its Treatment.—The treatment of truants is especially difficult, but it is not a case for corporal punishment.

1. Pleasure.—The class of children who play truant from the feeling of restraint associated with school must be *attracted* into the place. The building should be bright, roomy, airy, and well furnished. It should always be comfortable and healthy whatever the weather. The time table should be based on scientific principles; there should be periods of play each session; the

teaching should be made as attractive as possible; and the recreative side of the school work should be developed. The children will thus gradually see that school is a happy place despite its restraints, and that to go to school is not an infliction, but an advantage.

2. Impositions.—In other cases than the last, treat with increasing severity. If the co-operation of the parent is obtained, and the parental influence is sufficient, impositions can be given to be done at home. But this is rarely the case, hence they must be done at school if they cannot be done at home. The staff would have to stay behind in turns for this purpose.

Objections to this Method.

- (1) Parents often want their children; are often unsympathetic; and sometimes even hostile.
- (2) It throws extra work upon the teachers.
- (3) In large schools it interferes with the work of the school keepers very often.
- (4) It breeds a hatred for school work.

3. Detention.—Simple detention with no imposition is preferable to impositions; but it is open to the same objections principally.

4. Fines.—Stop the play, and deprive of any other privileges prized by the children of the school. This is only available for beginners.

5. Home Treatment.—It is best to write or visit, or invite a visit from the parent, and to place the whole matter in their hands. Show that truancy is an offence as much against home authority as school authority—some think more so. Have nothing to do with the punishment yourself, if you can help it. The teacher's work will be to win the boy into the school, not to thrash him in; and at the same time to try and cultivate his moral sense.

6. Expulsion.—As a last resource this may be desirable and efficacious where it can be done. It helps to awaken hostile and indifferent parents to a proper sense of their duty.

7. Truant Schools.—These are only used for incorrigibles, and where they are available expulsion becomes unnecessary. The disciplinary life of a truant school for a period has been found the best treatment for bad cases yet devised.

HABIT.—The best way to discipline children is to help them in the formation of good habits, for then the discipline will be a lasting influence. For this purpose both the nature and training of habit should be known.

I. Nature of Habit.—After a thing has been done a certain number of times, there is a tendency to perform the action again on the slightest stimulus. After many repetitions, the action becomes very mechanical, and almost automatic. In this respect it resembles instinctive or reflex action. As a rule, to perform an act requires a stimulus, and there is desire or compulsion prompting to the action. As habit grows, desire or compulsion becomes weaker, and a fixed disposition to act in the way specified is formed. This shows two facts as essential.

1. The Psychological Fact.—By this is meant there is a fixed disposition to perform the action, and that, too, without the promptings of desire.

2. The Physiological Fact.—This means that there is a modification of the nerve structures involved, and this depends largely upon nutrition. A well-nourished child is a favourable subject to work upon.

The habit may be mental as well as physical. We are said to have a habit of thought when we are subject to recurring modes

of mental operation. Association is another element. Some stimulus gives rise to some movement, and by association there is a tendency for the one to recall the other.

II. The Training of Habit.—Its importance is obvious, for habit is called second nature. We are creatures of habit, but we ought not to be its slaves. The teacher's function is to form good habits. To do this he must induce his scholars to make an effort, which must be sufficient to act as a *motive force*. Then there must be plenty of *repetition*, that the habit may grow and become independent of the will. Child life is the best period for this training. *Example* is necessary, as this brings into play the faculty for imitation, and lends consistency to the growth. Then the response to the stimulus must be *prompt*, for uncertainty and delay in response show imperfect habit. This course of training must be pursued until the child finds it produces discomfort to deny the habit, or difficulty to alter or regulate it.

CHARACTER.—The cultivation of good habits is a great aid to the formation of a good character, and this should be looked upon as the ultimate goal of all discipline. The term has a wide range of meaning, but in education it is generally used to denote in a special way a good or virtuous disposition of the feelings and of the will.

"A perfect moral character includes the familiar habits involved in a wide pursuit of individual good, such as industry, orderliness, temperance, the habitual control of the feelings, or moderation, and the firm control of the thoughts involved in reasonableness. It includes further the habits implied in a perfect fulfilment of human duty, as obedience, courtesy, veracity, justice, and beneficence." *The essential ingredient is fixity of disposition in right directions.*

But a perfect character also shows itself in a habitual and half mechanical pursuit of a number of detached ends or forms of good; it includes a disposition to reflect and deliberate when occasion requires.

Its Cultivation.—A mere glance at the circumstances of early life tells us that the actions of a child are determined and regulated to a considerable extent by the wishes and commands of others, *i.e.*, the first stage is to teach the child *obedience*. Sometimes it will be necessary to restrain or command, sometimes to persuade, advise, or enlighten; hence a study of character in each child is absolutely necessary.

The most powerful stimulus to goodness in others is *goodness in oneself*. Any one who can resist the influence of this mutual goodness, showing itself in actions good to giver and receiver, is a fit subject for the government of fear, and nothing else. But the good and kind teacher will require to study character so as to be able successfully to discriminate between the two classes. "Do unto others as they do unto you," is as much as can be expected of children in this direction; and the teacher who does not study character will probably ask too much or too little, to the injury of all concerned.

There must be an appeal to the *feelings*, for it is wrong to work by fear or pain alone. No good character could be formed in that way. The maxims of punishment must be grasped and applied upon an individual study of character. In this way the dispositions that lead to disorder and offence can be checked in the bud; and, indeed, until there has been time for such training to operate, the mind should not be exposed to temptation. For this purpose the *social affections* should be cultivated.

Activity should be recognised and utilised—not repressed. A child of an active temperament should be kept busy; whilst less demands should be made upon the weak and languid. Hence the work, to be profitable, needs differentiation. So far as the large classes of modern schools will permit, this principle of child life should never be neglected. Character will only be good and strong so long as it is built on the regulated forces of nature.

The *temperament* must be recognised and allowed for. The sanguine, the boastful, the self-assured may need checking; whilst the nervous, the timid, and the shy will need encouragement. The worse faults of child nature must be treated with care, kindness, and patience. The best results of the teacher's efforts will often be slow to show themselves, for character is the growth of years.

Variety is the spice of life, and this is remarkably true of child life. Monotony must not be allowed to deaden the budding gems of nobler thoughts and nobler aspirations which may be struggling to show themselves. Sustained effort is difficult to children, and it must ever be remembered that the moral side of child life often demands mightier efforts than anything submitted in the school curriculum.

EXAMINATION QUESTIONS.

- 1.—Why should young teachers be restricted from the use of corporal punishment, (a) for the sake of their scholars? (b) for their own sake?
- 2.—Point out some of the ways in which school discipline may be useful in producing habits of ready obedience, and name some characteristic features of good discipline.
- 3.—Show that rewards may be usefully employed in stimulating children to work. Name some rewards that may be connected with the daily work of the school.
- 4.—Show that clear distinction may be drawn between truthfulness and "telling tales". How can older boys be employed in assisting to maintain the discipline of a school?
- 5.—Show that inattention in a class may proceed from the faults of a teacher, or from causes other than faults in the children themselves.
- 6.—Show that harshness and untruthfulness in a teacher influence the character and behaviour of children out of school.
- 7.—Show that copying, especially in arithmetic, may be the result of bad teaching or of bad discipline. What precautions would you take to prevent the growth of such a habit?
- 8.—Is it a sufficient definition of good discipline to say that "it is the power exercised by the teacher over the children"? Give some distinguishing marks of good discipline.
- 9.—Show that what is called stupidity in children may arise from faults on the part of the teacher. Name some of the faults.
- 10.—Name some of the chief causes of truancy arising from faults in the teachers, or parents, or children. What steps were taken in your school to acquaint parents with irregularity of attendance? How were truants punished?
- 11.—What is truthfulness? Name some ways in which a child may be untruthful in act without saying a word.
- 12.—Were any special means used to secure the co-operation of the parents of the children who attended your class; and, if so, what was the result?
- 13.—By what special means would you try to promote truthfulness and punctuality among your scholars? State the motives which you would lay before your scholars as incentives to the constant observance of truth and punctuality.
- 14.—Give your opinion as to the value of rewards and punishments; and state the principle on which you think they ought to be administered.
- 15.—Mention any difficulties you may have met with in the effort to control the children you had to teach, and state how those difficulties were overcome.
- 16.—Illustrate from your practical experience, in a day school or elsewhere, the vital importance of securing good order in a school.
- 17.—How were you accustomed to deal with dull, lazy, or obstinate children, and what special means did you adopt for securing the attention of the children in your division?
- 18.—What methods have been adopted within your knowledge for correcting these faults in children: inattention, untruthfulness, laziness, impertinence, sullenness; and with what effect?
- 19.—It is said in the "Instructions to Inspectors" that, besides the usual course of instruction, an excellent school "seeks by other means to be of service to the children who attend it". Can you name any such means, and say which of them are likely to be most effective?
- 20.—How far is it in the power of a teacher, by other means than school lessons, to improve the habits, manners, and character of the children of a school? Mention any ways you know by which a teacher may exert useful influence in these respects.
- 21.—What is meant by good discipline? What are the means and ways of improving discipline?
- 22.—What are the best expedients you know for quickening and securing the attention of a languid or disorderly class?
- 23.—In some countries the teachers are absolutely forbidden to make use of corporal punishment in any form. Say by what other means it is possible to maintain discipline under such conditions.
- 24.—What is a criticism lesson? Under the head of "discipline," what points would you attend to in such a lesson?
- 25.—In what ways may success in class teaching be promoted by studying the characters of children?

CHAPTER III.

CLASSIFICATION.

I. Its Basis.—A school may be classified on a *single* or on a *plural basis*. On a plural basis classification is a simple matter, but on a single basis there is more difficulty. In the former case a pupil simply goes to the class in each subject for which he is most suited, but in the latter case the following facts must be borne in mind:—

1. Attainments differ.
2. Ability differs.
3. Age may, in special cases, have to be considered.
4. Special aptitudes and different rates of development in different children have to be allowed for.

Generally, age and length of time in school will count for little or nothing. **Equal attainments are the only real basis on which to proceed.**—Most schools adopt the single basis, but perhaps it is best to have a *dual classification* based on Reading and Arithmetic. Progress in these subjects is often very unequal, and so it would generally be more profitable to teacher and scholar to adopt the double basis. Where the single basis is adhered to, Arithmetic should be the deciding test. Inequalities in other subjects lend themselves more readily to class teaching than in Arithmetic, because greater mental demands are made by it. The industrious but dull pupil always labours with it; the careless one is always in trouble with it: whilst the inattentive fails at it because it is synthetically progressive.

II. Bad Classification.—There are certain evils associated with bad classification, so called; but the term is almost a contradiction, for classification is grouping according to real resemblances, and the real ones in school are ability and attainments. Some of the most obvious evils are as follow:—

1. There is a *waste of time*, for the pupils are not placed where they will obtain the greatest profit.
2. The *sympathy and respect of the class are lessened*, hence the teacher is robbed of his legitimate means of evoking the intelligence and activity of his pupils.

3. It prevents the children having constant and suitable employment.
4. *It injures discipline* for the reasons already given.
5. It produces *dissatisfaction* among the parents, and injures the reputation of the school.
6. It may cause *pecuniary loss* to the school, both directly and indirectly.
7. It advertises the *incapacity* of the teacher.

III. Infant Schools and Classification.—The Infant School contemplates in the *length, variety, and character* of its lessons the training of scholars whose delicate frames require very careful treatment. It is essential, then, that the *length* of the lesson should not in any case exceed thirty minutes, and should be confined in most cases to twenty minutes ; and that the lessons should be varied in length according to the section of the school, so that in the babies' room the actual work of the lesson should not be more than a quarter of an hour.

Each lesson should also be followed by *intervals of rest and song* ; the *subjects* of the lessons should be varied, beginning in the lower section with familiar objects and animals, and interspersed with songs and stories appropriate to the lesson ; the spontaneous and co-operative activity of the scholars should form the object and animate the spirit of each lesson.

Children will be classified according to ability, and not rigidly according to age. As a rule, the right classification of the children in an infant school will be found to correspond nearly with their ages. The best basis is Reading, because, as a rule, this will be found to agree broadly with age classification.

Age classification is unnatural, and should only be followed so far as equal attainments are coincident with the average equal age. Backward children admitted during the year, however, should not be allowed to drift into the baby class. The discipline, association, and instruction of this class would be most unsuitable for elder children. They should form a special class, or otherwise receive special treatment until they are fit to be drafted into one or other of the existing classes.

It will now be observed by the student that the single basis of classification in an upper department should be Arithmetic, and in an infant school Reading.

IV. Sub-division of Classes in Infant Schools.—Where possible, sub-division should be followed in the following lessons :—

1. Needlework.—Little fingers are not likely to thread and use a needle properly, or with profit, without much supervision and showing. Individual assistance will be largely required, and this will be impossible in large classes.

2. Writing.—In the early lessons, it is very important that the position of

the child and the manner of holding the pen or pencil should be well watched. Habits are being formed which will be physical evils if not closely watched and corrected. A smaller class is absolutely essential for this.

3. Reading.—The best practice in reading is individual practice. This is impossible in a large class. For the formation of a good enunciation, a distinct and clear articulation, the teacher must give the child much individual attention.

4. Drawing requires much assistance, and consequently a small class is essential. If the proper and necessary assistance is not forthcoming in such subjects, the child may form a dislike for it—a very undesirable result.

V. Shapes of Classes.—The shapes of the various classes depend on :—

1. The number of children in the class.
2. The amount of space available.
3. The furniture and its arrangements.
4. The amount and nature of the staff.

A. Reading.

1. *In Desks.* Children can sit or stand in their desks. This is not a good arrangement, even if the floor be stepped; for, if sitting, the pupils lose the chance of a necessary change of position, and they are apt to become indolent and inattentive. If standing, there is the tendency to lounge against the desks, and to produce a slovenly and disorderly appearance in the class.
2. *Drafts.* These should be formed out of the desks.
 - (a) *Semicircular Drafts.* This method is preferable to the desk method, as it secures the desired change of position, brings the pupils more directly under the observation and control of the teacher, and offers less opportunity for the formation of bad habits.
 - (b) *Parallel Drafts.* The smaller children should be in the front row and the taller boys behind. The teacher will then be able to stand in front of the class, and have it completely within the range of his eye.

B. Arithmetic.

The children can be arranged as in reading, but only in drafts when working on the slate, on the B.B., or from dictation. Usually this lesson will be given in the desks. If space permits the wide placing of the pupils, this arrangement is very satisfactory. But space rarely does permit. The class can then be *examined* or *worked* in two sections. It can be *taught* in one. The system of alternate boys working different examples tends to check copying, and to promote honesty, power, and independence. These advantages perhaps more than counterbalance the extra expenditure of time involved.

C. Geography.

Here the children can either be arranged in *desks* or on a *gallery*, if the school possesses one. The latter is the better arrangement, if the class be a junior one, and is working from the map. If an upper class and atlases are being used, the desks are the better.

The *position of the teacher* is important.

Reading. He should be in front of the class and to the centre. He should stand back sufficiently to bring the front rows under his observation.

Geography. If pointing to the map, he should be to the right, where his map should be placed. If the map be placed in front, he must either point inaccurately, or leave his class without supervision for short periods; which, however, often prove long enough to encourage inattention and disorder. If atlases are being used, he should be in front.

Arithmetic. Same position as for geography. The B.B. should be to the right, so that the teacher can work and still keep the class somewhat under supervision. When the B.B. is in front, he quite turns his back upon the class, and the class often shows that it is aware of the fact. If the boys are working examples, he should stand in front, and carefully watch to check any idleness or copying.

VI. Collective Lessons.—It is often desirable and convenient to group classes for some lessons, as it tends to economy in teaching power, and sets free one or more teachers for correction, preparation, or clerical work. In an infant school this grouping can be well done on a gallery. In an upper department, it might be done in the central hall, or in one of the larger rooms. There are certain subjects which lend themselves easily to the collective arrangement.

1. Singing.—Here sympathy of numbers will aid the physical and artistic training given by the teaching of this subject. Melodies and simple part songs, rounds and elementary sol-fa lessons can be better taught to a division than to a class, for such grouping gives confidence to the timid and shy.

2. Recitation.—Repetition and explanation, with some pattern work, is the programme here, and such instruction can be given to two classes as well as to one.

3. Scripture Lessons.—The moral truths of Scripture are generally presented in some biblical story, which can be given in a manner quite within the grasp of several classes, without forfeiting the natural attractions of a story to children.

4. Object Lessons.—Common information lessons can be given to many pupils at the same time, especially if the lesson is enlivened by a few sketches, diagrams, pictures, or experiments.

5. Musical Drill.—The size of the division will be limited by space sometimes, but a certain amount of grouping for small schools is possible.

6. Ordinary Drill.—After some preliminary lessons have been given, children may be grouped for military or Swedish drill. The added numbers generally bring added interest and added pleasure. This will apply only to small classes.

7. Kindergarten.—Some of the lessons admit of grouping (see chapter on "Kindergarten").

8. Class Subjects.—Their very name implies the possibility of grouping. Grammar, geography, history, elementary science, domestic economy, may all be grouped for instruction.

9. Elementary Subjects.—Mental arithmetic, and, in some cases, writing, also lend themselves to this arrangement.

A change of place and attitude is an absolute physical necessity. It affords a welcome relief to the sitting in desks, releasing one set of muscles, and bringing into play another set. It is a check to twisted shoulders, curvature of the spine, and injury to the eyesight, all of which may be induced by careless and continuous service in the desks. For Singing it offers special physical advantages, a standing position giving better play to the lungs.

VII. Promotion.—Promotion should be systematic and regular. Quarterly or half-yearly examinations should be held, and

the sharpest or best prepared drafted into higher classes. Otherwise, bad effects are produced on the scholars.

1. They find time for *mischief*, for necessarily they must be *idle* part of their time, or working fruitlessly.
2. They *weary* of their work, which becomes a sort of mental treadmill—ever moving, never advancing.
3. They frequently form a *dislike for school* altogether, and become more or less *irregular*.
4. They *interfere* with their slower comrades.
5. They often *retrograde* themselves, for monotony stunts.
6. Their non-promotion is an *injustice* to all concerned; to the child, who has a right to as much, and to the best, instruction the school can give; to the parents, and to the country, who share that right.
7. School life is short, therefore *progress should be as fast as Nature will permit*.

HOME LESSONS.

I. Subjects for Home Lessons.—The most appropriate subjects are those which involve either:—

1. **Reproduction** of some portion of the day's work, as in geography, arithmetic, grammar, or composition; or
2. **Preparation** for the next day's work, like spelling, map drawing, memory work (recitation, geographical facts, chronology in history, rules, tables, exceptions in grammar, etc.).

II. Revision of Home Lessons.—The time and methods of revision will depend on the methods of instruction and the subjects taught; and, probably, in some schools, upon the staff also, but it is assumed that all schools are staffed properly in these suggestions.

Spelling would be part of the dictation lesson.

Arithmetic can be marked by monitors or young teachers during some collective lesson. The chief errors can then be explained and corrected on the B.B.

Grammar. Parsing and analysis can be corrected as in arithmetic, or, with a good teacher, in the grammar lesson itself. Let boys change books, the method or order of change being varied from time to time. The teacher will parse and analyse the piece, the boys writing in the corrections in black lead, coloured ink, or pencil. The number of errors should then be neatly placed at the bottom of the exercise, and the exercise should then be initialed by the boy who corrects it. This checks all spite, carelessness, or collusion between boys; for the inaccurately or dishonestly corrected exercise can always be traced. This method also acts as a good disciplinary training to the boys, and helps to fix their work. It insures a maximum of attention, but it should only be used with the elder scholars. Memory work can be tested in the grammar lesson itself.

Geography can be tested during the geography lesson; maps by monitors or pupil teachers during the collective lessons. The prevailing errors should then be dealt with on the B.B. If the geography is an abstract, it must be corrected out of school hours, or as in grammar.

Composition must be marked out of school hours, or by young teachers during collective lessons. Correct the chief errors on the B.B., or, if composition lessons figure on the time table, the home lessons could be marked while the class is at composition.

Scripture should be tested in the Scripture lesson, or marked out of school hours.

Arguments for and against Home Lessons.

For.

1. They cultivate *self-reliance* and *industry*.
2. If honestly done they are a *true index of the child's own powers*.
3. They make a *favourable impression* on some parents.
4. They *supplement* and *fix the learning* of the child.
5. They *set the master at liberty* for higher work.
6. To a certain extent they keep children from the bad influences of the *street*.
7. Under certain conditions the Education Department recommends them. Their use should be "to illustrate and to fix in the memory lessons which have already been explained in school, rather than to break new ground or to call for a new mental effort. This purpose is served by lessons of a simple and definite character—a sum, a short poetical extract, a list of names or dates, a letter, an outline map, a parsing exercise, such as may be readily prepared in half an hour, and may admit of very easy testing and correction on the following day. When these conditions are fulfilled, the home task is found to have a very valuable effect, not only in helping the progress of the scholar and in encouraging the habit of application, but also awakening on the part of the parents an interest in the school work." (Revised instructions to H.M. Inspectors).

Against.

1. *The school day is already too long* for young children, some of our best authorities say.
2. They conduce to *over-pressure*, and may be physically injurious.
3. They frequently cause *friction* between parent and children and teacher.
4. *Public opinion* is in part opposed to them.
5. They may become *injurious both mentally and morally* by the formation of bad habits through want of proper supervision.
6. There is *little or no accommodation* in many of the homes for the doing of them.
7. *Change of thought is necessary* for the healthy development of brain power. A child should not take the school home with him.

HINDRANCES TO PROGRESS.—These may have a twofold origin :—

1. **From the Children.**—Here again the causes may be various.
 - (a) *Stupidity.* See notes on stupidity.
 - (b) *Poor Living.* This may be partial only, local, or intermittent. But it is a serious hindrance. The difficulty is now grappled with by the institution of large agencies for cheap and free dinners. Thousands of children are now fed at times in this way. This treatment has proved its own value both physically, morally, and mentally.
 - (c) *Clothing.* Children are insufficiently clad, and consequently physically uncomfortable, perhaps suffering. Appeal for old clothes in the local press or in any direction where your appeal may be successful.
 - (d) *Irregularity.* This is the greatest hindrance to progress that teachers have to grapple with. It arises from such a multiplicity of causes that to attempt a detailed account of its treatment is impossible here. The teacher's chief function in this matter is to make his school as attractive as possible, to show a practical interest in his pupils by the formation of and participation in cricket, swimming, and football clubs; to report on all absences promptly; to develop the sense of duty in his pupils as far as he is able; and then to leave the rest to the parents and the visitors.

2. Teacher.

- (a) *Bad Classification.* This is a fault of the teacher's. It can only be removed by thought and the study of good models.
- (b) *Bad Methods of Teaching.* Teacher must read and study, and then practise better methods of instruction.
- (c) *Harsh Discipline.* Harshness defeats its own ends. It may produce quietness, but this deceives no expert. The vitality of the children is lowered, and therefore the capacity for work is diminished. Besides, there are strong emotional disturbances set up which are very hostile. See under the head of "Harshness" in the chapter on "Discipline".

TIME TABLES.

I. Revised Instructions and Time Tables.—Every time table has to be approved on behalf of the Education Department by H.M.I., who thereby certifies that it fulfils the requirements of Section 7 of the Elementary Education Act of 1870. He will expect the time table to show that a due proportion of time is assigned in Infant Schools to manual exercises and recreative employments, and in other schools to each of the subjects of instruction, including any specific subject which the school professes to teach. *Nothing should be attempted which, having regard to the proper classification of the scholars, and to the number and qualifications of the teachers, cannot be efficiently taught in the ordinary school hours.* Scholars are not to be improperly detained beyond the prescribed time. The time table is also to be placed in a conspicuous position in the schoolroom, and it must be followed throughout the school year.

II. General Directions.—The writing of a time table is very difficult, because of the number of considerations to be studied. No set or stereotyped time table is possible, because of the varying conditions of the different schools. All that can advisably be attempted is the laying down of the chief principles and rules to be observed in their formation.

1. Building.—Consider the number and size of the rooms in your department, and the quantity and kind of furniture. A time table can be more easily made for a school containing several class rooms than for one without them. The supply of desks, galleries, etc., will determine the nature and order of the lessons.

2. Staff.—The best disposal of a staff is important. Each teacher must be placed where he can teach to the greatest profit. Manifestly a time table for a school with assistant teachers will be different to one with pupil teachers or monitors.

3. Class of School.—Whether boys', girls', infants', or mixed; whether full time or half time; whether a poor class school or one placed in a good neighbourhood; whether small or large; whether backward or well taught.

4. Locality.—A town school will require a different time table to a country school; a school in a manufacturing district, to one in a rural, marine, or mining district.

5. Time.—The number of hours in the school week ; the length of school life ; the amount of time to be given to each subject ; the length of each lesson—all these have to be considered and regulated. No lesson should be more than three-quarters of an hour, and the length of lesson should be graded to suit the age and capacity of the children. More time will be required for the *Elementary Subjects* than for the *Class*, and more for the *Class* than for the *Specific Subjects*.

6. Laws of the Mind.—The lessons must be so arranged as to afford the necessary mental rests. The lesson of much mental effort must be followed by a mechanical lesson ; *e.g.*, writing might follow grammar, or *vice versâ*. Then the most exhausting subjects should come in the morning, and they should be the first lessons.

7. Classification.—The basis of classification adopted in the school must be considered. Most primary schools are classified by the standards ; but where this is not done, the school should be classed on a basis of arithmetic or reading. The number of classes must fall within the limits of the staff, and the accommodation of the rooms.

8. Official Rules.—The Department lays down certain rules and limitations with respect to time tables, and these must be considered. School Boards sometimes order that so much time per week shall be given to certain subjects (*e.g.*, religious knowledge, singing, drawing, manual instruction, etc.). Under some School Boards the nature of the time table is much influenced in this way.

9. Recreation.—The time table should show about ten minutes each attendance for play. In the upper department, military, musical, or Swedish drill will be taken, and this must appear in the time table.

10. Registration, etc.—The time devoted to this should always be shown. If the registers are marked twice each attendance, once for the early and once for the late pupils, both should appear on the time table. Assembly, religious observances, and dismissal should also be shown.

11. Locomotion.—Physical relief must be arranged for. The classes will require to remove from the desks to the drafts, or to the gallery or class room. This must be so arranged as to cause a minimum amount of noise and disturbance.

12. Summaries.—Three tables or summaries should appear on each time table :—

- (a) A list of the subjects taught, and the total number of hours given to each per week.
- (b) The number and quality of the staff, *i.e.*, head teacher, assistants, and pupil teachers.
- (c) A small table showing when the model and criticism lessons are given.

III. Advantages of Time Tables.

1. To the Children.—They discipline work and teach the value of method and punctuality. The children become habituated to obedience to rules laid down by others, and this is a gain for the State. The steady and regular habit of work enforced by the time table is forming habits which will beneficially influence their adult life.

2. To the Teacher.—His time is spent to the best advantage under its guidance. The mental wear and tear is considerably less. He knows his work for each hour, and soon falls into a well-arranged and busy routine, which is a means to his happiness. The children have their faculties worked to their best advantage, and this is more productive both to teacher and those taught.

IV. Distribution of Time.

1. In Infant Department.—This will depend upon the class. Supposing the school hours to be twenty-five, we get something like the following :—

1. Registration, religious observances, religious instruction, $4\frac{1}{2}$ hours.
2. Recreation, $2\frac{1}{2}$ hours.
3. Arithmetic, $3\frac{1}{2}$ hours.
4. Reading, $3\frac{1}{2}$ hours.
5. Writing, 3 hours.
6. Needlework, 2 hours 50 minutes.
7. Object Lessons, 1 hour 40 minutes.
8. Singing, 1 hour.
9. Spelling, $\frac{1}{2}$ hour.
10. Kindergarten, 1 hour.
11. Drill, 50 minutes.
12. Recitation, 30 minutes.

This distribution of time would be approximate only in the babies' class, as these little ones would have a Kindergarten lesson each day, as well as an extra lesson in Singing and Recitation on Needlework days. The Arithmetic would be taken directly after Religious Instruction, as the children are then most capable of mental effort. The object lesson would therefore be given each morning for the same reason. Singing, Needlework, Recitation, and Kindergarten are the most suitable for the afternoon. The fifty minutes for drill allows five minutes sharp exercise each morning. This exercise immediately preceding the object lesson, and for a lesson of twenty-five minutes' duration once a week.

But, speaking generally, the time will vary with the class and subject. The following items were copied from one of the very best infant schools in London, and they bear out the necessity for variation :—

Subject.						Classes.						
{	Kindergarten	-	-	-	-	50'	55'	55'	55'	55'	1'20'	3 hrs.
	Drawing	-	-	-	-	1 hr.	1 hr.	$\frac{1}{2}$ hr.	$\frac{1}{2}$ hr.	$\frac{1}{2}$ hr.
	Object Lessons	-	-	-	-	1 hr.	1 hr.	1 hr.	1 hr.	1'50'	1'50'	3'25'
	Singing	-	-	-	-	55'	1 hr.	1'25'	1'25'	1'25'	1'55'	2 $\frac{1}{2}$ hrs.
						I.	II.	III.	IV.	V.	VI.	VII.

Only a few subjects are quoted, but they are sufficient to show the variation of time required and practised.

2. In Upper Department.—Here the distribution of time will vary so often that it is almost useless to suggest any scheme for

imitation. The district of the school, the quality of the children, the teaching staff, the building, the apparatus, etc., are all varying factors, giving varying products. The young teacher is advised to make a copy of the distribution of the time as shown on the school time table, and to insert it for reference and illustration in his note book or method book.

EXAMINATION QUESTIONS.

- 1.—Notes of lesson on *Home Lessons*.
- 2.—Give some of the subjects appropriate for home lessons, and give a sketch of a week's home lessons for scholars in the Fourth Standard.
- 3.—Show that for some lessons infant classes should be smaller in number than classes composed of older children, and that for other lessons one or more classes may be grouped.
- 4.—What bad habits are produced by careless correction of exercises and by want of attention to home lessons?
- 5.—Name some suitable subjects for home lessons, and state the most suitable times and methods for their revision. What objections are sometimes raised to home lessons?
- 6.—State fully the bad effects that are produced by retaining a clever child in one class for a year without due promotion. How often should promotion be made?
- 7.—In what different shapes may classes be arranged for Reading, Arithmetic, and Geography lessons? State which shape you consider best for each purpose, and why you would employ that arrangement. What should be the position of the teacher in regard to his class?
- 8.—What bad effects are produced by imperfect classification, both upon the more and less advanced members of a class?
- 9.—What were the chief hindrances in the way of the progress of the children you used to teach, and how did you attempt to remove them?
- 10.—Out of twenty-five hours a week in an infant school, or out of thirty hours in a school of older children, what time should be devoted to each employment or subject of instruction? Give your reasons.
- 11.—What is the best classification of an infant school? What exercises in number would be suitable to each class?
- 12.—On receiving new scholars in the school, what is the best way of deciding in which class to place them? Give reasons for your answer.

CHAPTER IV.

NOTES OF LESSONS.

YOUNG teachers are generally plunged into all the difficulties of lesson sketches without training or graduation. An attempt is here made to recognise their difficulties, and to meet them with systematic preparation. For this purpose the work is divided into so many steps, each of which should be thoroughly mastered before the next is attempted.

I. First Step.—The following facts should be thoroughly grasped and learned before any attempt is made to write notes of lessons :—

1. Class.—The attainments of children differ according to their class, and so does their mental power very often; hence, matter, method, and language will often require different treatment for different classes. The first step will be to decide to which class the lesson is to be given. Then the average power and attainments of such class should be gauged, and the notes drawn up accordingly.

2. Time.—Next decide the length of the lesson, as the amount to be taught and the methods to be adopted must depend on the time allowed. Do not attempt too much, for little and well is better than an indigestible mass. The time should vary with the class, twenty to forty-five minutes being the extremes. Remember the power of sustaining attention is of slow growth, and is very limited in young children. A lesson which produces early or undue weariness is a useless and even injurious one.

3. Aim.—The aim of the lesson should next be considered, and the *Special Aim* (if any) is the one referred to. Every lesson has a *General Aim*, which is always obvious; e.g., to teach Reading in a reading lesson, to learn the structure and functions of a language in a grammar lesson; and so on. This can be disregarded. But the *Special Aim* has a further object. In a lesson on an animal the teacher may try to show adaptability to structure; in

a Scripture lesson, to force home some moral truth; in an object lesson, to illustrate some natural law. When this special aim is stated, the teacher must be careful to focus all his matter and method upon it. It is the common goal of all the steps taken in the lesson. Every point must be worked out under its influence, and the entire lesson must receive its shape and bulk from it. Early attempts at writing notes of lessons should, as a rule, be limited to the general aim, and to elementary subjects or common objects.

4. Introduction.—Too much time must not be spent in introducing the lesson. Often it will be sufficient to simply announce the subject, and then to proceed with it at once. If the lesson is one of a series on the same class of subjects, a little judicious recapitulation of the previous one will serve to connect the two, and to arouse some interest. Elaborate introductions worked out at the expense of the time of the lesson itself, and with the laudable desire of arousing interest, often defeat their own ends. Interest will always be the product of the lesson itself, if it is properly handled. The *place* of the introduction is important. Three common errors are prevalent with respect to its position :—

- (a) It is placed *above* the notes with the class, time, aim, and apparatus.
- (b) It is placed in the *matter* column.
- (c) It is written across both *matter and method* columns.

All these positions are objectionable, for the introduction is essentially a part of the method of the lesson, and nothing else. Consequently, it should be placed *in* the method column, *e.g.* :—

Matter.	Method.
I. Introduction. (As a rule merely write the word here.)	Show your method of introduction here.

If the lesson should be one of a series, the introduction has certain *objects* at which it aims, such as :—

- (a) To recall the most important facts and truths of the last lesson.
- (b) To arouse the mental activity of the class by awakening interest.
- (c) To awaken their sympathy, and
- (d) To enlist their co-operation by maintaining the continuity of the lessons.

Methods of Introduction.—These will vary with the subjects of the lessons.

- (a) **Reading.**—Say a few words about the subject matter of the lesson, or about the author, and set the meaning of the chapter clearly before them.

(b) **Writing.**—Pick out the common errors of the previous lesson; place them on the B. B. ; in each case show wherein the error lies; give specimens of correct writing, and contrast the two.

(c) **Arithmetic.**—Introduce by mental arithmetic, leading up to and embodying the principle or rule to be taught.

(d) **Grammar.**—Place sentences on the B. B., embodying the results of the last lesson, and suggestions for the present lesson.

(e) **History.**—Question on the previous lesson. Bring out the points that bear upon or lead to the proposed lesson.

(f) **Geography.**—The method will vary here. Objects may have to be shown, maps or diagrams used, models exhibited; or questioning only may be required. The subject of the lesson must decide in each case.

(g) **Object Lessons.**—Show the object itself, if possible; if not, show a picture of it. Ask a few connecting questions with the previous lesson (if one of a series), and begin at once.

II. Second Step.—A complete copy of notes of lessons on some common object should now be placed before the pupil teacher, and he should be asked to carefully study it. A lesson on the *Sponge* will be found in the chapter on object lessons, and that lesson will be found suitable for such a purpose. Certain characteristics of the lesson should be pointed out, and the young teacher should be asked to distinguish like characteristics in other notes of lessons. He should observe that in the matter column notes are given, and not descriptions; and that the sequence of teaching is observed in starting with the known and proceeding to the unknown. In the method column he should seek to recognise the instrument or aid used by the teacher; whether it is observation, interrogation, illustration, experiment, or description. The lesson referred to is a simple one, so that it may serve as a type or study for *all* pupil teachers, irrespective of their school departments. This will involve some knowledge of these aids, and the student is recommended to read them through. They will be found in the chapter on class teaching. He will then be able to perceive that such lessons are largely experimental, and at a later period he will recognise that they are, like this one, inductive in their method, which is the most educative form of teaching for such lessons.

III. Third Step.

1. Matter.—This will be met with under different names in different subjects. Sometimes it is called *Matter*, sometimes *Information*, sometimes *Principles and Examples* (Grammar and Arithmetic); but the term *Matter* will here be used in a generic sense as including all. It should be terse and to the point, so as readily to appeal to the eye; and it should be written in one column. Young beginners often find it difficult to distinguish

matter from method, and some teachers recognise this difficulty by throwing matter and method into one column. In fact, matter and method often seem to interlace and overlap. Nevertheless, it is strongly recommended that an effort be made to keep them apart. Then the matter must be brought under proper *Heads*, and in separate paragraphs or statements. The *more important* should be distinguished from the less important by the size of the writing and by the width of the margin. The matter should always be written in the form of *Notes*, and not small essays; in fact, it should be strongly borne in mind that *Notes of Lessons* are to be written, and not *Essays of Lessons*. This rule will exclude nearly all questions and descriptions. Such important matter as Rules of Arithmetic, Definitions in Grammar, and general principles should be written in larger type, to indicate their importance. Nor should the lesson be overcrowded with information; for the amount does not depend upon how much can be *told*, but rather upon how much can be worked out in the allotted time. Hence all irrelevant matter should be excluded; and it is easier to do this in the *Notes* than in the actual teaching itself. Finally, *avoid egotism*; it is unnecessary and unpleasant. "Now I'm going to tell you," and such personal elements, are objectionable.

2. Matter in Order.—The student should first be supplied with the matter in the order for teaching. By practice and training he will soon be able to put matter into the requisite order for himself; but whilst this logical faculty for arrangement is being cultivated, the teacher's assistance should be given by arranging the matter for him. The matter (in order) of a lesson on some common object having been given by the teacher, it is recommended that the pupil write notes of a lesson from it. The lesson should then be examined, corrected, and criticised by the teacher, and the corrected lesson kept by the pupil for future reference and use. The matter of other lessons should be similarly treated.

IV. Fourth Step. Matter not in Order.—A little extra work should now be thrown upon the pupil. The matter is still found for him, but it is not arranged in the necessary form for a lesson. He should now attempt to make this arrangement himself, bring it under its proper heads, and then complete the lesson, with help if necessary. Text books and books of other kinds will afford plenty of matter in a form suitable for this purpose. In fact, this is generally the way in which matter is presented to the young

teacher for notes of lessons; and after passing successfully through the previous steps, he should be in a better condition to deal with this stage of the subject. In no case should too much be attempted.

V. Fifth Step. Heads of Lessons.—The student will now be able to exercise some judgment in the selection of matter. He has been supplied and drilled with matter in order, with matter not in order, and with masses of matter to select from. He should now be drilled in writing the heads of lessons, so as to train his analytic powers over a wider range of subjects. He has learnt to select suitable matter, and to arrange it in proper order. The work is not new to him, for in arranging matter in order he has practically arranged it under heads; but the power needs strengthening and developing.

Having determined what he will teach, and how much of it he will teach, he should make a careful analysis of the subject matter, and arrange it in divisions and sub-divisions. The logical connections must be maintained, and the sequence of teaching must be observed. This sequence is based on great principles, simple of comprehension and easy of application, and it must not be violated. It embraces the following principles:—

1. From the simple to the complex.
2. From the particular to the general.
3. From the concrete to the abstract.
4. From the indefinite to the definite.
5. From the empirical to the rational and scientific.
6. From the outline to the details.
7. From the physical to the mental; and generally,
8. From the known to the unknown.

The last principle includes several of the former, but they are stated in detail, so that the student may the more readily recognise them and their applications.

There must not be too many heads, otherwise there is cross-division and confusion. Then they must be marked by clear, distinct, and broad lines. The power which, most presumably, many students will have already acquired in mapping out a course of thought in Composition Exercises, in analysing the subject matter of their History, Descriptive Geography, Scripture, etc., will now be serviceable. There are many lessons scattered through this book, and the student might copy their "Heads" in turn, and try to write lessons from them. He should then choose other subjects, and write heads under them. These should be submitted to the head teacher and discussed, the necessary cor-

rections being made in each case. The corrected "Heads" should then be preserved for subsequent use.

VI. Sixth Step. B.B. Sketches.—A number of B.B. sketches should now be supplied to the student, and these he should be asked to expand into lessons. They are not necessarily the same as the heads of the lessons; in fact, they are rarely so. No "Notes" are complete without them, *i.e.*, if the notes are meant to be presented in a complete or examination form. The summary may take one of two forms:—

1. **An Analysis** of the chief heads and sub-heads of the matter column.

2. **A Statement** of the chief facts of the lesson. Anything that is striking or important should be brought out and placed at the end of the lesson, and during the actual teaching it should find its way on to the B.B. This form is the better one of the two, and it is what is generally meant by B.B. summary or sketch.

The B.B. sketch is also a good indication of the teacher's power of using the B.B. A few sketches are now given, and the student is recommended to expand them into complete lessons, and to get them criticised by the head teacher.

1. Cork. (a) Properties and Uses.

- (1) It is light; hence used for making boats, cork jackets, floats, etc.
- (2) Compressible; hence used for bottle corks and bungs.
- (3) Elastic; it is also used for socks in boots.
- (4) Impervious.

(b) How Procured.

- (1) It is the bark of a small evergreen oak.
- (2) The bark is carefully removed from the tree every eight or ten years.
- (3) It is then slightly charred or scorched.

2. Exercise.

- (1) It is a natural instinct.
- (2) It is necessary for muscular development.
- (3) It is healthy in moderation. Want of exercise increases tendency to infectious disease.
- (4) Abuse of exercise is dangerous.
- (5) It develops the muscular sense.
- (6) It is a moral agent.

VII. Seventh Step. Apparatus.—A still further demand might now be made. The apparatus for a lesson should be given, and from this a lesson should be constructed showing what use could be made of it. The apparatus used should always be stated at the head of the lesson—both special and general apparatus. It is one of the four guiding and explanatory items which should find a place at the head of most notes of lessons, and the lesson should be carefully thought out, and the apparatus jotted down, before the "Notes" are attempted. Subjoined is an illustration of what is meant;—

NOTES OF A LESSON ON SOME FLOWER.

1	Class - - -	Standard III.
2	Time - - -	Forty minutes.
3	Aim - - -	To cultivate a love of flowers.
4	Apparatus - -	B.B., coloured chalks, slates and pencils, specimens of flowers, lenses, needles, pigskin, treacle, a glass vessel for holding water.
Matter.		Method.
The matter should be commenced here.		The method should be commenced here.

VIII. Final Step. Complete Notes.—The pupil should now, after some practice under the last head, be able to write complete notes of lessons unaided. Of course, *all* notes will still be submitted to the head teacher for criticism; but no special preparatory aid as detailed in the various steps will be given. Should any particular weakness be shown in writing these unaided notes, a return should be made to the particular “step” for further aid and practice.

Lessons Criticised.

I. A Good Lesson.—The following tests have been laid down:—

1. Are the main points told or discovered? As a rule they must not be told.
 - (a) Is each point a problem to the class?
 - (b) Is it clear before the class?
 - (c) Is its difficulty felt?
 - (d) Is the process one of thought?
 - (e) Is everything (that can be) pictured out?
 - (f) Is every point illustrated by incident and analogy to make it still clearer and to fit it firmly?
2. Is there a right use of experiments and diagrams?
3. Is there a sifting examination at the end of each point, and a recapitulation of the lesson at its close?
4. Has too much been attempted?
5. Is there a proper use of the B.B.?
6. Is there a well-defined purpose in view?
7. Is the plan of the lesson simple, natural, and logical?

II. A Bad Lesson.—One of H.M.I.’s summarises bad lessons as follows:—

1. **The Echo Lesson.**—Mere statements and questions.
2. **The Lecture Lesson.**—Exhausts children, and often sends them to sleep.
3. **The Desultory Lesson.**—A number of disconnected topics.
4. **The Discursive Lesson.**—A comet lesson.
5. **The Personal Lesson.**—The Inspector is lectured, instead of the class being taught.
6. **The Disproportionate Lesson.**—Details crowd out the essential points,

7. The Assumptive Lesson.—The teacher either disregards altogether the previous knowledge of the children, or assumes greater knowledge than they possess.

8. The Mechanical Lesson.—The questions do not exercise the intelligence.

9. The Irrational Lesson.—Attempts are made to elicit from children matters of fact (heights, lengths, etc.).

A Criticism Lesson.

I. What it is.—A criticism lesson is really a training lesson for the young teacher. In it he puts forth his best methods and powers. It is a special effort; the summit of a teacher's skill and nerve. It is a composite and difficult production, requiring for its success a theoretical and practical knowledge of teaching; the aid of a good, conscientious, and skilful head teacher; a certain amount of knowledge of child mind, character, and life. Furthermore, the personal equation must always be a strong factor. There must be good disciplinary powers, ready tact, and a warm and sympathetic nature, to beget effort and attention. In the earlier days, perhaps even all through a pupil teacher's engagement, it should follow *Model Lessons* given by the head teacher or some well-qualified assistant. A model for imitation is an aid worth more than all information gained by reading and lecture; and, above all, it bestows confidence.

II. Its Subject Matter.—Too often the subject matter is confined to object lessons, because these offer special scope for preparation, experiment, illustration, and criticism. But criticism lessons should embrace *all* the school subjects—especially the standard and class subjects. These form the greater part of a child's education, and the methods used in imparting them are very important in their effects upon the young and plastic minds of the scholars.

III. Criticism.—This should be two-sided; it should expose the weakness and commend the excellences. Pupil teachers are rarely allowed to criticise, and there are several good reasons against it, among which will be staff difficulties and the limited knowledge and experience of the pupil teachers. But where possible senior pupil teachers should be allowed to criticise their fellow pupil teachers, subject to the after criticism of the head teacher. There would then be an extra inducement to study methods, and extra mental effort to follow a lesson critically. There would be practice in Analysis as well as in Synthesis. At present the criticism lesson is often a purely synthetical exercise—the exercise in writing the lesson; but inter-criticism would call forth valuable

analytic effort, and for this reason it should not only be allowed, but encouraged.

There are a few rules which should be attended to in criticising. It is not advisable to overcrowd with instructions for criticism, or confusion and mechanical routine may be the undesired result. The power to criticise well and in detail will grow with experience and knowledge. The teacher will be able to extend his criticism proportionately; but all first efforts should be simple, and directed towards the essential parts of a lesson. The good should receive praise, the bad correction; but, over and above these two essentials of criticism, there are certain other things to remember and to do.

1. If the criticism is destructive, it must also be constructive. Where methods are condemned, better methods should be suggested.
2. Commendations must be reasonable, and the reasons for the praise should be given.
3. Criticism should be short and pointed. There is no compulsion to deal with every portion of a lesson. It is the strength and weakness that require attention.
4. An aid in the shape of a criticism form should always be used. No special form need be committed to memory. A form devised by the student himself will be of more value educationally than any prepared form copied from a text book. For such a form must of necessity be stereotyped, and therefore not suited to all lessons. The form should receive its shape from the lesson, not the lesson from the form; and the latter is the tendency where stereotyped forms are used. Again, the form should not be crowded with too much detail, or the criticiser becomes a slave to it. The following form is not offered as a model for all lessons. It is simply a graphic suggestion to the pupil teacher or student to draw up his own.

CRITICISM FORM.

No.	Subject, etc.	Matter.	Method.
1	Subject - - - - -		
2	Class or Average Age - - - - -		
3	Time - - - - -		
4	Apparatus - - - - -		

No.	Teacher.	No.	Class.
1	Manner - - - - -	1	Attention - - - - -
	(a) Voice - - - - -		
	(b) Gesture - - - - -	2	Interest - - - - -
	(c) Position - - - - -		
	(d) Temper, etc. - - - - -	3	Discipline - - - - -
2	Language - - - - -		
3	Questions - - - - -	4	Intelligence - - - - -
4	Recapitulation - - - - -		
5	Experiment and Illustration - - - - -		
6	Blackboard - - - - -		

CHAPTER V.

CLASS TEACHING.

The Teacher.—To organise and classify a school well, to educate the scholars to the best advantage, the teacher must be well equipped with suitable qualifications, mental, moral, and physical.

I. Mental Qualifications.—The teacher must be well-read, with an ample knowledge of the subjects embraced in the school curriculum. He should prepare his lessons carefully, so that his information may be accurate and precise. If he is to be successful, he must be a permanent student, for the improvement of his own mind, and to keep him in better sympathy with his class. He must be natural in his language, and modest over his acquirements. He should form good intellectual friendships, so that he may rub shoulders with better minds than his own. This will check the too prevalent tendency to pedantry. Teaching requires good descriptive powers, and these should be sedulously cultivated. He must keep pace with the times by bringing his methods up to date, and this can only be done by study and observation.

II. Moral Qualifications.—His character must be beyond reproach. No one is more restlessly watched than a teacher; no one is more persistently copied; hence he must guard his *temper* so as to present a cheerful front to his class at all times. "A boy compelled for six hours a day to see the countenance and hear the voice of a fretful, unkind, hard, or passionate man is placed in a school of vice." *Cheerfulness* is as essential as anything. Its association with work is a valuable lesson to the children, for they learn that work need not necessarily mean dullness. The teacher must also be *sympathetic*. Sympathy is contagious and productive, calling forth the respect and esteem of pupils and parents, and making school a happy place. Especially must he form and teach *good habits*, and to do this successfully he must understand the principles upon which habit depends—association, repetition, concentration, and nutrition. All *motives* that influence children for their good must be called into requisition, and his own habits

must be shown to be guided by these principles and influenced by these motives.

III. Physical Qualifications.—A teacher should be a fair adept at some of our national games, so that he may maintain his own health and share the games of his pupils. He should be quick of eye and ear, so that it may be known that nothing will escape his notice. His voice should be nicely pitched, pleasant yet authoritative, and in discipline it should be used as little as possible, for a noisy teacher makes a noisy class. His work should also be characterised by energy and zeal, and a healthy body is absolutely essential for this. Such conditions will beget like qualities in his pupils, and bring immediate and future profit.

The Diary.—Each pupil teacher is recommended to keep a diary, which should be the log book of his professional life. It should duly show each subject, and the quantity of that subject set for preparation; it should contain columns for the marks or remarks of the head teacher; it should record the successes and failures (if any) of the year's tests and examinations.

Such a book would show at once the weak and strong points of the year's course; it would indicate the course of study in each subject, and so lead to a careful mapping out of that *self-set revision* which every pupil teacher should practise, whether attending "Centres" or not. The book would be an incentive to zeal, would add interest, and would generate a legitimate pride in the work. It would also be valuable for inspection and reference by the head teacher, the managers, and H.M.I. It would give the student that training in self-reliance, forethought, and methodical work which are the only guarantees for thoroughness and success.

A separate book should be kept for criticisms on the notes of lessons. An ordinary exercise book could be ruled up for this purpose, but a stiff-backed book is recommended for preference. The ruling will depend upon the ambitions and chances of the pupil teacher, but something like the following is suggested:—

Date.	Preparation.	Marks or Remarks.	Notes of Lessons.	Criticism.	Examination Successes.
July 24, 1894	French xxi. History, Charles II. Arithmetic, page 209; Examples 6-12. Euclid ii. 7.	These are to be entered here by the teach- er (P.T.).	Sponge.	Enter the Criticism here.	Government Examination "Well". Freehand, 1st Class. Advanced Physiology, 2nd Class.

The remarks in the third column would be added after the work had been returned by the head teacher. There would then be no "mistakes," or "forgettings," or "misunderstandings," which are always more unfortunate for the pupil teachers than for anybody else.

Exercise Books.—Exercise books are necessary for the following purposes:—

1. The reproduction of work learnt.
2. For the various mathematical, grammatical, composition, and other exercises.
3. For note-taking, although a set of smaller and stiff-covered books is recommended for this purpose.
4. For scrap work.

The first three should be kept for reference and revision. Furthermore, H.M.I. can and does sometimes ask to see the complete set for the year. Managers also sometimes require a sight of them. A separate book should be kept for each subject, and every lesson should be dated. The work should be neat, methodical, and easy of examination, so that every lesson becomes a training for good teaching in school, and for good reproduction in examinations.

Aids to Teaching.—The teacher having first decided *what* he will teach, and having suitably arranged the matter he has chosen, has next to consider the *way* in which this matter shall be presented to his class. Having decided the *what*, he has now to decide the *how*. Shall it be by experiment and observation, by description, definition, or explanation? Or shall it be by a selection from, or by adopting all these aids? He has further to think out his style of questioning, so that it may be suitable to the point before the class, and he must also know how to make a proper use of the answers given, to know which to accept and which to reject. There must also be a wise use of examination for the purposes of reproduction. All these items constitute the aids or instruments used in teaching. They are the teacher's tools, and if good work is to be produced the right tools must be used in the right way.

A. Examination of Classes.—Examination is one of the teacher's aids, and properly used, it may be made very valuable. Probably most teachers have a system of periodical examinations extending throughout the year. The results of these examinations should be registered and compared from period to period. If the tests given have been reasonable and just, the disappointments

revealed by an examination enable the teacher the better to guide his work.

I. Methods.—Practically all methods are reducible to three.

1. By written tests.
2. By oral examination.
3. By both methods combined.

II. The Written Method.—Each system has its advantages and disadvantages.

1. Advantages.

- (a) The pupils are thrown entirely on *their own resources*. This is the *direct value* of the method.
- (b) It compels careful preparation and attention. This is its *indirect value*.
- (c) *It cultivates composition*. This can be varied by the monosyllabic or phrase method.

2. Disadvantages.

- (a) *It requires good powers of composition*, and this is a separate gift. Pupils consciously weak in composition are apt to be discouraged. To obviate this the teacher should make careful allowances in such cases.
- (b) It takes up *too much time*.
- (c) It may lead to *speculation*. A pupil may simply learn those portions which look most likely to be set.
- (d) It induces "*brewing*". Pupils try to hide their ignorance beneath a foam of words.

III. The Oral Method.

1. Advantages.

- (a) It is, or can be made, *expeditious*.
- (b) It maintains more *interest*.
- (c) It is more *just*. It enables the teacher to adapt his questions to the individual capacities of his children.

2. Disadvantages.

- (a) Unless the teacher is alert, it enables the *lazy* to shelter themselves under the bright and industrious.
- (b) *There is a tendency to simultaneous answering*, and the checking of this takes time and sometimes brings discouragement.
- (c) It induces *guessing*.

IV. The Double Method.

- (a) This method may be used sometimes with advantage. A short written test, followed up by oral questioning, ought to enable any average teacher to thoroughly examine his class.
- (b) The value of this method is acknowledged by most University and other examiners, who set papers for written tests, but retain the right of *vivâ voce* examination to follow.

B. Questioning. I. Conditions for Success.—Few parts of a teacher's work offer such fine opportunities for showing his professional calibre as questioning. Skilful questioning is not easy, nor is it common—at least, among young teachers. This is not to be wondered at, when we consider the mental demands it

makes. Very often there is little or no opportunity for the young teacher to hear *good models*, and this is very essential for success in most cases. Then there is also required good *analytic and classifying powers*; the ability to see and maintain a *logical connection*, and the power of *description*. Exercise strengthens faculty, and *practice* makes perfect, and this latter requirement is within the reach of all, although it is not enough of itself.

II. The Objects of Questioning.—Most of these are obvious.

1. *To find out what the child knows.* This is necessary before the teacher can profitably give any further instruction; and, furthermore, it is necessary to test from time to time in a lesson what has been taught.
2. *To keep the minds of the children active, and to maintain attention.* It is necessary to know whether each child is mentally awake, whether he is following the teacher, and whether he understands what is given him. Otherwise the teacher would fail to discover the misconceptions and difficulties of the pupils, and much of his teaching would be wasted.

III. Places for Questioning.

1. At the *beginning* of the lesson.
2. At the *end* of the lesson.
3. At any point or *great division* of the lesson.
4. And, generally, when there is any doubt that any portion of the class has failed to grasp any point or fact in the lesson.

IV. Rules for the Formation of Good Questions.

1. Positive Rules.

- (a) The language should be *simple, clear, familiar, terse, and to the point*.
- (b) *The question should be suited to the capacity of the class*; that is, it should not be so framed as to be beyond their mental grasp. Capacity embraces knowledge and natural ability; over-estimate neither if you wish to succeed.
- (c) *The questions should follow in proper sequence*; that is, they should be logically arranged.
- (d) *They should also be suited to the information of the children*; that is, they must not embody or demand knowledge not within the possession of the children. A question may be quite within the ability of a class, but out of their present knowledge.
- (e) Never lose sight of the real function of questioning—to find out what children *do* know: not what they do not know.

2. Negative Rules.

- (a) See that the repetition of the question *does not add to it*.
- (b) *Avoid leading questions, and do not let them suggest their own answers.* Make them demand a reasonable effort.
- (c) The questions must not be *ambiguous* or *vague*.
- (d) *Avoid elliptical questions.* They are noisy, and neither indicative of sustained attention nor knowledge. Their use should only be tolerated for a rapid interrogatory recapitulation.

V. Defective Questions.—Any breach of the above rules will lead to defective questioning.

C. Answering.—The skilful manipulation of answers is an-

other mark of the gifted or experienced teacher, but much may be done by the proper comprehension of a few primary principles.

I. Answers; their Value.—Answers are valuable in teaching:—

1. Because they necessitate *attention*, and so help to form the valuable habit of *concentration*.
2. They require *thought*, and so give training to the *reason*.
3. They necessarily exercise the *memory*.
4. They induce *mental activity*, and so sharpen the wits.
5. They measure the *degree of success* attained in the lesson.
6. They offer some amount of *logical training* both to teacher and class.

II. Good Answers.—Good answers are known by the following marks:—

1. **Thoughtfulness.**—A good answer will always show thought, although may not be a ready answer.
2. **Clearness of Expression.**—The language used should be sufficient to express the whole idea or statement. It should give all that is asked for, and nothing more.
3. **Correct Interpretation.**—This will be a result of thoughtfulness and natural ability. Pupils often fail to interpret a question correctly because they allow themselves little or no time to grasp its point.
4. **Good Arrangement.**—This, like the previous quality, applies particularly to written answers. If a question contains more than one point, each point should be answered under a separate heading. Again, many answers admit of clear, terse, methodical arrangement, and it is the pupil's business to detect and use these opportunities.
5. **Economy.**—There should be a proper economy of time, space, and language in the answer. Pupils often give more than is asked for because they cannot give enough of what is demanded. This is always unwise, and must be discouraged.

III. Received Answers.

1. **Good Answers.**—These should be accepted and commended.
2. **Honest Answers.**—These may or may not be good, but if they indicate honest effort they should always be accepted. Never reject an answer with the slightest atom of truth or effort in it.
3. **Partial Answers.**—An answer need not necessarily be rejected because it is not full, exact, or neat. Encourage a free expression of thought if you wish to train the intelligence.

IV. Rejected Answers.

1. **Flippant or Careless Answers.**—These should be discouraged and repressed. A little judicious exposure will be useful for this purpose. But never snub or ridicule, however unsatisfactory the answer may be; for educational result is disastrous.
2. **Hasty or Random Answers.**—These should also be refused; but at the same time they should receive attention. The motive which made them hasty or random must be sought, and the correction applied to that.
3. **Incorrect Answers.**—These may or may not be rejected. The teacher must use his discretion. They will usually fall under one of the other heads and should be treated accordingly. The answer may show thought, although incorrect; it may show honest effort, although not what was expected or desired; and in either case it should be treated tenderly, so as to encourage further effort.
4. **Guesses.**—Reject these, for they usually arise from idleness or inattention. They may arise from stupidity or ignorance, and in such a case will

require kind treatment. But otherwise expose by further questioning, which may bring a little correction to bear upon the offender.

3. Dishonest Answers.—These will sometimes be met with in written answers. They may be copied from a neighbour, from a text book, from smuggled notes, or in some kindred way. The answer may involve a reproduction of something previously done in an exercise book, and still there existent, and this may be slyly utilised. Reject all such answers, for they indicate a weak or low moral tone, which is something far worse than ignorance, whether it arise from stupidity or inattention.

D. Explanation.—By explanation in teaching is meant the process by which is cleared away from a word, phrase, or statement all obscurity of meaning, so as to make it intelligible. The meaning is made plain, or else it is not explanation. Then the fact or idea must be stated in its simplest form, and this implies a good *command of language* and a *readiness of illustration* which are only obtained by *plenty of good general reading*. It is more than the mere changing of one word or phrase for another, for the substituted phrase must be simpler and clearer.

In most lessons there is much to explain, and the teacher who omits any necessary explanation is wasting his opportunities. He must be watchful to detect and utilise all occasions for its use. The parts of a lesson are often like the links of a chain—one obscurity may spoil the whole lesson to some members of the class.

A common defect in explanation is the added difficulty of the explanation. The substituted word is often more difficult than the original one, *e.g.* :—

Glen, a dale.

Man, a living, organised being, having sensation, reason, and voluntary motion.

Grimace, a distortion of the countenance expressive of affectation or some strong emotion.

Perhaps it is hardly necessary to point out to teachers that this is not explanation, but greater obscurity or confusion. The language used must be within the grasp of the children's capacity, and the method must be intelligible.

E. Description.—By description is meant the act of representing a thing by words or signs, or by both. It is the process of forming a *word-picture*, and is sometimes called *word-painting*. It tries to give an account of the nature, properties, or appearance of a thing, so that the children may form a just conception of it. It expands the work of a definition, is sometimes described as "*picturing out*," and is really another form of exposition. Good descriptive power may be a gift, but more often it is a matter of

cultivation. But a good description involves a good mental picture of what is to be described, for the description ceases to be good if anything essential is omitted; and above all, the ideas and the language which expresses them must be within the knowledge or experience of the children.

Exposition is really a form of description, and it is used to clear away obscurities from whatever cause they may arise. By exposition the sense or meaning is laid open, and it may be called the art of clearly conveying thoughts or ideas. As in other cases, the language and ideas must be within the capacity of the children.

F. Definition.—When we define a word, we seek to determine its common qualities or marks. We seek to lay bare the whole meaning of the term. The definition can also be expressed in the form of a proposition, in which case the term to be defined is the subject, and the explanation the predicate, *e.g.* :—

Subject.	Predicate.
Man (<i>the term</i>) - - -	is a food-cooking animal (<i>explanation</i>).

Contrast is an important part of definition; for in defining any term, such as *government*, it is contrasted with other forms of government. Three terms are involved in definition, the meaning of which the pupil must thoroughly grasp before attempting to frame definitions. They are as follow :—

1. **Genus.**—This is that part of the definition which is common to the term defined, and to the other terms with which it has been compared.

2. **Species.**—This is the term which has to be defined.

3. **Differentia.**—This is the portion which distinguishes the term defined from the terms with which it has been compared.

The student will now understand what is meant when it is said that *Definition should be per Genus et Differentias*. A term (*Species*) has to be defined, which term (*Species*) is compared with a larger class (*Genus*), and the differences (*Differentiae*) are pointed out. A study of the examples given will show that in each case a *Species* is defined; that it proceeds through (*per*) the larger class (*Genus*), and points out the differences (*Differentias*).

<i>Species.</i>	<i>Genus.</i>	<i>Differentias.</i>
A house	is a building	to dwell in.
A church	"	to worship in.
A barn	"	to store grain in.
A school	"	to teach in.
A factory	"	to manufacture goods in.
A bank	"	to deposit money in.
A theatre	"	to see plays in.

Rules of Definition.—These are thus laid down by our best authorities :—

1. A definition must be *per genus et differentias* ; i.e., it must state the essential attributes defined.
2. A definition must not contain the name defined.
3. The definition must be exactly equal to the species defined ; i.e., it must denote the species, the whole species, and nothing but the species.
4. It must not be expressed in obscure, figurative, or ambiguous language.
5. It must not be negative where it can be positive.

Experiment, Observation, Classification, and Reasoning, will be found under the head of Elementary Science.

NOTE BOOKS.

Their Use.	Their Abuse.
<ol style="list-style-type: none"> 1. They enable the pupil to take down any detail given during the lesson. It is not safe to trust the memory too much owing to the amount of work thrown on it and the conflict of interests ; the strong over-ride and crush out the weak. 2. They improve the method of the class, which learns to copy the teacher. 3. They enable the pupil to get a number of peg words down, which bind the lesson and make its reproduction thorough. By peg words are meant suggestive words or phrases which are useful to hang facts and statements upon in the memory. 4. They are a fine aid to concentration, for the attention must be keenly maintained to make " notes " of any value. This is one of their best uses. 5. They thus aid the memory by fixing the attention and by facilitating revision. 6. They are economical, for they are calculated to save the purchase of other books. 7. They may develop a power of analysis and condensation if the pupil is trained to reproduce the substance of a lesson in a synoptic form. 8. They may increase the vocabulary and power of composition of the pupils. 	<ol style="list-style-type: none"> 1. Mere dictation of notes is extravagant and almost useless. Notes are only valuable when the class has to reproduce the lesson afterwards by the aid of their own self-made notes. 2. Copying notes from a book is a waste of time. The process is purely mechanical, and the thoughts of the author are merely transferred from one book to another. 3. They are also destructive. " Men seldom read again what they have committed to paper, nor remember what they have so committed one iota the better for their additional trouble. On the contrary, I believe it has a direct tendency to destroy the promptitude and tenacity of memory by diminishing the vigour of present attention, and by reducing the mind to depend on future reference " (Sydney Smith). Perhaps this statement goes too far. Self-made notes, if well made, involve a power of analysis and a readiness of revision which many think have some value. 4. Copious note-taking is a waste of time and distracting.

EXAMINATION QUESTIONS.

- 1.—Say what is the use to a pupil teacher of keeping a diary of employments or notes of the lessons he or she gives. If you have been accustomed to preserve such a record, describe it.
- 2.—State what use you have made of note books and exercise books as a pupil teacher, and how such books ought to be kept.
- 3.—What is the best method of examining a class ? What kind of questioning should be avoided ?
- 4.—On receiving new scholars in the school, what is the best way of deciding in what class to place them ? Give reasons for your answer.
- 5.—" The answers given by children to questions are too often confined to single words." Why should this be objected to, and what means can be adopted to encourage children to make complete statements and sentences of their own ?
- 6.—What are the advantages and disadvantages (if any) of encouraging the scholars to put their own questions at the end of a lesson ?

CHAPTER VI.

OBJECT LESSONS.

"It has been observed that in schools in which Object Teaching has been introduced with most success, the teachers have carefully distinguished between two kinds of instruction, which in other schools are not seldom confused. These two kinds of instruction are—(1) observation of the object itself; and (2) giving information about the object. This distinction is of importance, because the scope and method of the lesson differ according to its nature. Object teaching leads the scholar to acquire knowledge by observation and experiment; and no instruction is properly so called unless an object is presented to the learner so that the addition to his knowledge may be made through the senses."

"Junior teachers have not unfrequently given lessons before H.M. Inspectors which were wrongly described as object lessons, because in dealing with the topic selected no suitable appeal was made to the eye of the scholar. A lesson, for example, on the elephant to children in village schools, who have no opportunity of visiting either museums or zoological gardens, may convey information and store the memory with interesting facts; but it does not cultivate the habit of obtaining knowledge directly and at first hand, or develop the faculty of observation. However well the lesson may be illustrated by diagrams, pictures, models, or lantern slides, if the children have no opportunity of handling or watching the actual object which is being dealt with, the teacher will be giving an *information lesson*, rather than an object lesson. It should be always remembered that in object lessons the imparting of information is secondary to the cultivation of the faculty of observation."

"Object teaching should further be distinguished from *instruction in natural science*. It is *elementary science* only in so far as it aids the child to observe some of the facts of nature upon which natural science is founded; but as it deals with such topics with-

out formal arrangement, it differs widely from the systematic study of a particular science. The principles of scientific classification, the continuous study of one group of natural phenomena, the generalisation from facts and the search for natural laws, belong to a later stage of mental discipline, which will be much more effectual if it is being based upon the preliminary training of the senses through sound object teaching. It is most important, therefore, that if, for example, object lessons are given on plant life, no attempt should be made to treat them as a continuous introduction to the study of botany, or, if the lessons relate to animal life, to the study of zoology. In object teaching the chief interest in the lesson should centre in the object itself."

Suggestions.

1. The teacher should select only so many of the objects set forth in the appended or other similar lists as can be dealt with in the year without overburdening the scholars. Habits of observation are better cultivated by the thorough examination of a few objects than by the superficial treatment of many.
2. *No object should be chosen which the teacher cannot thoroughly illustrate* either by the object itself or by some adequate representation of the object, or by both. All that is purely technical, whether in the mode of study or the language and terminology, should be carefully avoided.
3. The children should be encouraged to bring with them to the lesson *illustrative specimens* which they have collected or borrowed from friends.
4. The children should be encouraged to make *simple drawings illustrative of their observations*, wherever possible, and in certain cases to make simple records on square-ruled paper. *Clay modelling and other manual occupations* may be employed to test the accuracy of the impressions which the children form, and to fix them in their minds. Teachers should also frequently illustrate details of the lesson by *B.B. drawings*. Children who are jaded in five minutes by a lecture will be open-eyed and receptive for half an hour while the teacher draws as well as talks.
5. *Visits to museums* and other institutions of educational value are now recognised by the Code, and may advantageously be undertaken where possible in connection with the object teaching. Occasional *class excursions* out of school hours (or, if the instruction be in accordance with Article 12 (*f*) of the Code, in school hours), under proper guidance, will enable teachers both to provide suitable objects and to confirm previous impressions. It should be borne in mind that objects when they are brought into the class room cannot be there studied under their ordinary conditions, and therefore it is important by a proper use of such expeditions to let the children see what part the object plays in its usual surroundings.
6. If the scholars are to learn intelligently from their object lessons, *the first requisite is trained attention*. The right method of securing this is to direct, in a conversational way, the attention of the children to the different parts of the object in an orderly manner, and explain the relation of each part to the whole. After the analysis or study of separate detail, the object should again be treated as a whole. It should not be left in fragments, but the division into parts should be followed when possible by the reconstruction of them into their original

unity. Through such teaching the vague and indefinite impressions which the children receive from objects when they are first presented to them are gradually converted into clear mental pictures.

7. "The attempt to teach children to be accurate in observation cannot be separated from the need of making them *accurate in description*. After the children have been trained to observe a fact, they should be practised in making a correct statement of it in a sentence of their own. This oral answering in complete sentences will lead to correct use of the English language, both in talking and writing, and will store the mind with a useful vocabulary. In the higher standards, the children will be able to write brief weekly compositions in which they may express in a written form the ideas which they have acquired through oral instruction."—*Circular 369*.
8. The lesson should be previously well thought out, the subject matter should be *logically arranged*; the *illustrations* should be varied and suitable; there should be a proper use of *experiment*; the childish love of *activity* should be used; the *personal qualities of the teacher* must include tact, sympathy, and patience, and his language and questions must be suited to the capacity of the class; the *sequence of teaching* must be observed, and the method of teaching must be *psychological*; *i.e.*, the lessons should exercise the *senses* chiefly at first; the *conceptive faculty* next; and the *reasoning faculty* last.

Their Value.

I. Principal Uses.

1. The first and most important is to teach the children to observe, compare, and contrast.
2. To impart information.
3. To reinforce the other two by making the results of them the basis for instruction in language, drawing, number, modelling, and other handiwork.

II. Minor Uses.

1. Object teaching makes the lives of the children more happy and interesting by opening up an easily accessible and attractive field for the exercise of brain, hand, and eye.
2. It gives the children an opportunity of learning the simplest natural facts, and directs their attention to external objects, making their education less bookish.
3. "It develops a love of nature and an interest in living things, and corrects the tendency which exists in many children to destructiveness and thoughtless unkindness to animals, and shows the ignorance and cruelty of such conduct. The value of the services which many animals render to man should be dwelt upon, and the importance of kindly treating them and preserving them should be pointed out."—*Circular 369*.
4. Whilst training the intelligence generally, they especially afford a fine medium for the training of the senses, and in so far as the first of the principal uses does not include this, it should be counted in that category. It also aids the teaching of the abstract by the concrete, and arouses a healthy curiosity.
5. Object teaching has also a moral use. It helps to form good habits which have a beneficial influence on the lives of the children when school days are over. It helps to develop a higher moral tone, for the beauties and marvels of nature, exemplified in everything around them, must tend to produce feelings of wonder, reverence and gratitude to the Great Author of all.

6. Object lessons encourage a tendency to self-reliance in children, and in developing this tendency they do not seek so much to give information as to help the children to get information for themselves. They not only teach children to see things instead of merely looking at them, as is pointed out under their principal uses, but they teach them to decompose the confused aggregate of impressions which things "at first make upon the mind ; to get them to classify and to generalise and to connect simple phenomena with their antecedents and consequents ; exercise the reason ; and to do this in Nature's own way, by bringing the learner as far as possible into direct contact with things, and satisfy his own instinctive needs ".

The Training of the Senses.

One of the primary objects of object teaching is the proper training of the senses, especially of sight and touch, which are pre-eminently the intellectual senses. The importance of sense training is further recognised by the admission of hand and eye training, kindergarten and its developments, drawing, clay modelling, and manual instruction into the school curriculum. All these exercise the senses in a number of ways, and so supply the materials of knowledge ; for there can be neither a wide nor an accurate knowledge of the world around us without *the proper exercise of the senses through material objects*. This is the first and most important element in the training of the senses.

Having presented proper materials in a suitable variety, the teacher next teaches the children *to observe* objects as distinct from mere sight sensations. Points which would escape the cursory glance of most children are detected with the teacher's aid, and an effort is made to *stimulate curiosity and arouse interest*. The children are invited to handle the things for themselves and to examine them. As much *movement* as is consonant with proper discipline is also allowed the children, so as to bring the feeling of muscular movement to the aid of sense impressions. The fixing of associations of this kind are not only necessary but valuable. The child's *activity* is thus utilised to the best advantage in allowing him to use his hands and his eyes in investigating the things supplied to him ; and it must ever be remembered that it is only in this way that real sense knowledge is ever acquired ; that is, *in bringing the mind in contact with things immediately*, and not mediately, through the intervention of another mind, whether it be the teacher's or that of any one else.

The objects presented should be *graded* and then placed in *juxtaposition for comparison and contrast*. In teaching colour the simple colours should be first examined, then the compound, and

finally, shades of the same colour. Striking differences should always be first dealt with, the less obvious ones following in accordance with their difficulty of discrimination. A child will learn to distinguish the elm and the cedar more easily than the oak and beech.

There must also be a certain amount of *repetition* to ensure familiarity and easy identification. Without this no habit of close examination can be formed, and no deep interest can be aroused. We are rarely, if ever, deeply interested either in mere passing objects, events, or acquaintances.

The method of the lessons must be such as to cultivate the *attention*, and to train it to fix itself upon what is present. Concentration is a form of genius, and to secure this the training must be such as to enable the child to turn its attention voluntarily to the object under consideration.

The *play* of the child should be utilised. This is the underlying principle of all kindergarten instruction which recognises the fact that a child never tires of a building box, whilst the clay modelling of the school is only an educational application of the mud pie of the gutter.

Observation should be utilised in every possible branch of school work. Models, diagrams, pictures, and the various forms of apparatus have all sprung into existence in recognition of this fact. But there must be *no hurry* in any stage of the process, for where there is no firm grounding of sense knowledge, all after knowledge is limited. "Imagination will be hazy, thought loose and inaccurate, where the preliminary stage of perception has been hurried over."

SCHEMES OF OBJECT LESSONS

FROM CIRCULAR 369.

The following lessons deal with the ordinary phenomena of common life and with objects familiar to the children. The teacher's choice is not confined to these lists; other objects will be accepted subject to the approval of the Inspector. Any of the objects may be dealt with at the discretion of the teacher in more than one lesson; and although they may have been grouped for convenience of reference, it is not intended to prescribe any specified number of them for a yearly course. With different treatment the same object may be adapted to more than one standard. Some teachers may prefer to deal with the same object in successive years, or to recur to it after a year's interval, expanding the study to suit the growing powers of the scholars. To meet the varying requirements of teachers it will be noticed that in some cases the names of the objects have been merely enumerated, while in other cases a few suggestions have been added as to the mode of treatment.

I. PLANT LIFE.

(a) **The Study of Plants as Growing Things.**

1. Grow an *onion* in a bottle of water, and note appearance of root and stem. Make a model in clay of the various stages of growth at short intervals.

2. Grow *mustard seed* on damp flannel, and note stages of growth.

3. Notice a few curious *roots*.

(1) *The Carrot*.—Cut off the top of one and grow it in a saucer of water. Contrast the root of a daisy (fibrous).

(2) *Roots which Walk*.—Strawberry or strayberry.

(3) *Violet Root*.

(4) Contrast *root of Iris and Solomon's Seal* in their modes of extension.

4. *Stem*.—Count the rings in a trunk that has been felled. Rings, how produced: the record of wet or dry seasons.

Climbing Stems. Ivy.—Train bindweed up a stick, and note that it turns to the right. If you unwind it and force it the other way (to the left), note how it resumes its old direction again, holding the stick with one of its leaf stalks to get a purchase for the change.

5. Simple experiments to show effect of light on (1) leaves, and (2) roots. *Celery*; blanching.

6. *Leaves of deciduous trees* contrasted with leaves of evergreens. Contrast leaves of holly, ivy, and box with leaves of oak, elm, and beech.

Note autumn tints. Collect and press leaves of various colours in autumn.

7. *Buds*.—Leaf buds and flower buds. Parts of a flower.

8. *Fruits*.—Different kinds.

(b) **Blossoms, Fruits, Seeds, and Leaves.**

Parts of a flower.

Flowers of curious shape.

Pea blossom.

Insects and flowers.

Colours of flowers and insects.

Fruits.—How seeds are scattered.

Shooting seeds.

Flying seeds.

Curious flowers, e.g., primrose, compound flower (daisy), water lily.

Leaves.—Shape, veining, arrangement.

Flowers as supplying—

(1) Weather glass.

(2) Clock.

(3) Calendar.

(c) **How Plants are Adapted to their Surroundings.**

A bunch of spring flowers (according to time of year).

A bunch of summer flowers (according to time of year).

A bunch of autumn flowers (according to time of year).

Flowers and the soil.—Bog plants.

Riverside plants.

Plants that grow in running water.

Plants that grow in still water.

Meadow plants.

Plants of the heath and moor.

Plants of the hills.

Plants of the wood.

Plants of the sea coast and salt marshes.

Sundew and flesh-eating plants.

Ferns.

The Spores of Ferns.—Grow some spores in a pan under glass and watch growth and development of fern. Contrast with growth of mustard from seed.

Mosses.

Lichens.

Funguses.

Simple experiments in manuring plants.

How plants help or hinder each other's growth.

Parasites.—Mistletoe.

Plants which help or injure man.

II. ANIMAL LIFE.

(a) *The Cat* (compare with dog).—Eyes, rough dry tongue, soft pads and sharp claws, teeth, method of holding prey, drinking, covering of fur, whiskers, tail.

The Cow (compare with sheep and goat).—How she takes her food, teeth, chewing, milk (cheese and butter), tail, hoofs, covering, ears, horns, nose.

The Horse (compare with donkey).—Covering, teeth, hoofs, tail, mane.

The Rabbit (compare with hare).—Teeth, legs, feet, claws, covering, tail, whiskers, ears, eyes.

The Mouse (compare with rat and water rat).—Teeth, paws, tail, whiskers, eyes, ears.

A Fish.—How fitted to live in water, weight, shape, covering, temperature, movements.

A Plaice (compare with herring).—Flat, eyes on one side of head, gills, movements.

Animals which sleep in winter.—Examples: Squirrel, dormouse, common snake, frog, toad, snail, slug. Preparation made for sleep.

(b) *Mole*.—Shape, snout, teeth, paws, claws, eyes, ears, fur, food.

Hedgehog.—Covering of spines, how it rolls itself into a ball and why, head, teeth, food.

Common Snake (compare with viper).—Shape, covering, teeth, how it moves, how it swallows its prey.

Frog (compare with toad and newt).—Movements, capture of prey, breathing, winter quarters.

Garden Snail (compare with slug).—Shell, mantle, head, horns, eyes, food, preparation for winter sleep.

Earth Worm.—Shape, rings, locomotion, food, usefulness.

Spider (contrast with bee).—Shape, seg-

ments, legs, eyes, jaws, spinnerets, web, breathing organs.

(c) *Paws and Claws and their uses.*—Cat, dog, rabbit, mouse, mole, frog.

Tails and their uses.—Horse, cow, dog, donkey, cat, monkey, harvest mouse.

Tongues and their uses.—Cat, dog, cow, woodpecker, frogs.

Teeth and their uses.—Man, cat, cow, horse, rabbit, snake, fangs of poisonous snakes.

Hair, Fur, Wool and their uses.—Cat, mole, dog, sheep, fox.

Beaks of Birds and their uses.—Duck, fowl, parrot, sparrow, goat sucker, heron.

Feet of Birds and their uses.—Duck, fowl, swift, owl, etc.

Insects.—Examples: Bee, beetle, butterfly, cockroach, silkworm. Insect development, legs, wings, segments, mouth, breathing apparatus, ovipositors.

III. THE SKY, THE AIR, THE SURFACE OF THE LAND, AND WATER.

(a) The Sky.

Sunrise, Noon, and Sunset.—(Note the object over which the sun is seen to rise from month to month. Note sun's position at noon, and its varying height above the horizon.)

Shadow.—(Note, by aid of a spike erect on a flat disc, the varying length of the shadow at noon. Study the shadows of objects, variation in sharpness and depth.)

Moon.—(Note the changes. Draw the shape from week to week.)

A few of the Brightest Constellations.—(Make diagrams on square ruled paper from a study of the sky itself. Great Bear and Pole Star, Lyre and Vega, Cassiopeia.)

Planets.—(Note any planet visible when the lesson is given. Mark its position on square ruled paper for a few weeks.)

Varying length of Day and Night.

(b) The Air.

Wind.—Varying direction. (Note and keep record of the direction of the wind from day to day.)

Warmer and colder winds; rainy and dry winds.

Moisture in the air shown by seaweed; string (changing tension).

Wet cloth dries in the wind (water turns to vapour).

Vapour turns to water. (Breathing on slate. *Clouds* on hills. Evening mists.)

Clouds in the sky. Three chief kinds: "Heaps," "beds," "feathers".

Rain.—(Note size of drops. Raindrops on dust form little balls. Note effect of heavy rain in tearing up roads. Note the channels so made, and the arrangement of the sand and pebbles washed to a distance.)

Rainbow.—(Note the succession of colours. Note position of the sun behind observer and of the bow where the shower of rain is falling. Note that height of arch changes. When is it higher and when lower?)

Rainbow colours on shells, film of tar, etc., feathers of birds.

Dew.—(Note when formed. Cloudless weather. On what does it lie thickest?)

Hoar frost.

Snow.—(Note size of flakes. Movement of flakes in the air as they fall. Snowdrift. Snow squeezed into ice.)

Hail.—(Note when it falls. Examine hailstones. Is the hail accompanied by thunder?)

Thunder and Lightning.

(c) The Surface of the Land.

Level or Sloping.—Simple way of measuring slope. Height of school and neighbouring hilltops above sea level.

Flow of Water over the Land.—Neighbouring stream or streams. Water partings.

The river basin in which the school is situated.

Construct a model fountain and make simple observations on the pressure of water. Milldam. A head of water. *Notion of falling water as a motor.*

Soils.—Clay, sand, slate, granite, chalk, quarries near school, gravel pits, clay pits, brick works. (Note how the rocks lie, in layers or in masses without structure.)

Stones in the brook, water-worn; pebbles on beach, rounded; pebbles in gravel pit, often with sharp edges, perhaps ice-borne.

Difference between sand and mud.

Crumbling Rocks.—Effect of frost on damp rocks.

Caves by the sea formed by the waves. Caves inland formed by rain dissolving limestone; stalactites. (A lesson for schools in limestone regions or near rocky coasts.)

Building Stone.—Marble, slate, bathstone, sandstone, etc.

In marble, note shells, etc. Note plants in coal.

Volcanic Rocks.—Lava, brimstone, pumice stone, basalt or whinstone. (According to the nature of the district.)

Rock Salt.—Crystals of salt. Salt in sea water. Mineral in solution.

Hard and Soft Water.—Rain water compared with streams from chalk or limestone. Leavings after evaporation. Fur in kettles. Softening hard water.

(In certain districts) other minerals in solution: Sulphur wells, iron springs, medicinal waters.

Mortar and Cement.—(Slake lime and make mortar; note the heat, etc.)

Surface Soils.—Crumbled rocks. Water-borne sand and mud. Vegetable mould and earthworms.

Vegetation and Cultivation.—Forest, moor and heath, heathers.

Hedgerow Trees.—Elms, ashes.

Trees of the Forest.—Oak, birch, beech. Evergreen trees: Pines and firs.

Evergreen Plants and Shrubs.—Ivy, holly, box. Contrast evergreen and deciduous leaves. (Note changes at fall of leaf. Autumn tints. Press specimens.)

Riverside Trees.—Willows, poplars, aspens.

Hill Pastures and Meadows.—Turf on the downs and hay in the valleys.

Gardens and their contents. Garden fruits and wild fruits. Garden flowers and wild flowers.

(d) **Water.**

Standing Water.—Ponds, pond life.

Springs and Running Water.—Clear water looks shallower than it is. Simple experiments in illustration.

Study of Flow of a Stream.—Where the flow is quicker, (a) in the middle, (b) on one side, outer and inner bend. Where the bank is eaten away and where sand is spread out. Varying bottom, deep pools, shallows, sand banks. Confluence of tributary. Delta. Measure the speed at which the water flows.

Study of Sea Shore.—Rocky and sandy coasts. Soundings. The rise and fall of the tide. Currents. Drifting sand. Effect of frost on cliffs. Breakwaters. Layers of soil and rock exposed down the side of a cliff.

Measure with thermometer the temperature of (a) a spring; (b) a stream; (c) a pond; (d) the sea.

Ice.—Study hardness, mode of fracture, splitting blocks with a needle. Does it sink or swim in water? Easy to make two surfaces of ice freeze together. Simple experiments with ice.

Watch and record behaviour of thermometer plunged in melting ice.

Melt some ice carefully to find out whether

it takes up more or less room than the water into which it changes. (Force a mass of ice into a lump of clay, and let it melt there.)

Freeze some water in a bottle, and note bursting of bottle. Bursting of pipes.

Notes on *expansion and contraction* of substances illustrated by behaviour of water at different temperatures. *Preliminary notion of thermometer.*

Watch cold spring water being heated to boiling point in transparent glass vessel. Note bubbles of air given off, and as the water is heated bubbles of steam rise from below. Observe force of compressed steam. *Preliminary notion of steam engine.*

Dribble powdered alum into clear water. Hang thread in the solution, and note the formation of crystal. Alum and other crystals.

Expose to the air crystals of (1) salt; (2) soda. Note change. What difference? What difference according to weather? Expose to the air crystals of saltpetre, and note result.

Dribble salt into clear water and note that it *dissolves*, quicker at first, then slower. At last no more is dissolved. Place a fresh egg in saturated solution, and afterwards transfer it to clear water.

One liquid is *denser* than another. Compare water and mercury. Things which float in mercury and sink in water.

Upward pressure of water on bodies dropped into it. Why bodies sink or float. Why steel ships float. Why cork floats.

Simple experiments in displacement of water.

Simple experiments in pressure of water and pressure of air. Siphon, squirt, pump, diving bell.

Distillation of water. Filtration.

Water, a combination of two gases. Oxygen and hydrogen. Simple experiments.

IV. OBJECT LESSONS FOR TOWN SCHOOLS.

(a) *The water we drink.*—How obtained. Some of the simpler properties of water.

River (or canal).—According to circumstances.

Boats, barges, or ships, with which children are familiar.—According to circumstances.

Other ships, e.g., Atlantic liners.

Bricks.—Their size, shape, and manufacture; their size, etc., to be ascertained by children's measurements.

Bricklayer's work.—Arrangement of bricks in 14-inch wall and 9-inch wall, shown with real bricks or with small wooden ones; mortar, etc.

Coal.—Its simpler properties.

Coal.—How obtained.

Coal.—How transported and how used.

Coal gas.—It may be made in the presence of the children.

Gas works and gas pipes.

Petroleum.—How obtained; its simpler properties and uses.

Lamps and their dangers.

Common stones used in building and road-making.

Roadmaking and paving.

Quarries and quarrymen.

Railways.—General sketch.

Engines and carriages.

The work of railway men.

The park or public garden.—One or two of its more conspicuous trees.

The park or public garden.—One or two of its more conspicuous plants.

Comparison between calico and flannel.

Cotton and its manufacture.

Lancashire and the cotton district.—Mills.

Sheep clipping and rearing.

The West Riding of Yorkshire; factories, etc.

(b) *Cart horse.*

Donkey.

Sparrow.

Rat or mouse.

Cat.

Plants grown in schoolroom.—(Acorn in

glass of water; mustard and cress; hyacinth in water or pot; fern.)

Costermonger, and what he sells.

Some common fruit sold in streets or shops, e.g., pears and apples, strawberries, oranges, coconuts.

Things seen in a grocer's window, e.g., tea, sugar, coffee, currants, and raisins.

The baker and his work.

The milkman.

The addressing and posting of a letter.

The postman and Post Office.

The sweep and his work.

Dangers from fire, and how they may be avoided.

The fireman and fire engines.

Bus or tram drivers.

The policeman.

V. OBJECT LESSONS FOR COUNTRY SCHOOLS.

(a) *The farmyard*.—Its buildings and their contents. Animals kept on a farm and their uses. Necessity for cleanliness, kindness, and suitable food.

The dairy and its contents.—Butter and cheese making.

Bees.—Bee keeping.

Spring.—Spring flowers. Work in the fields in spring. The cuckoo and swallow. Record date of arrival.

Summer.—Different kinds of leaves and fruit. Work in the fields in summer.

Autumn.—Work in the fields.

A mill and the work of a miller.

Winter.—Frost, ice, snow.

Birds.—Singing birds, as the thrush and nightingale. Birds of prey, as the hawk. Swimming and wading birds, as the duck and heron.

Wild animals.—The fox, the hare, and rabbit.

Minerals.—A mine. Three useful minerals.

The lessons on the seasons should correspond with the actual seasons of the year, and the different operations explained should be taken while each is in progress.

Leaves of trees may be dried by simply placing them between sheets of paper and pressing them. Their shapes may be used for the children to draw round on paper, which can afterwards be pricked and then sewn round.

(b) *Springtime*.—
 { The waking of Nature;
 { the lengthening daylight
 { in the morning and evening;
 { the coming warm
 { weather; birds singing,
 { building their nests, laying
 { their eggs; the trees and
 { hedges changing; buds
 { and leaves; the bloom
 { on fruit trees.

The local wild flowers of spring.—The daisy, primrose, bluebell.

Summer time.

The local wild flowers of summer.

Autumn.

The local wild flowers of autumn.

Winter.—The repose of nature.

The land.—Woodland, meadowland, ploughland, moorland.

The sky.

A bird.—Covering, wings, beak, feet, motion, nests, eggs, food.

Local birds.—Thrush or blackbird, lark, robin, rooks.

Birds which come for the summer.

Birds which come for the winter.

Local wild animals.—Rabbit, hare, fox, hedgehog.

Animals on a farm.

Our village.

The carrier's cart.

The cottage garden.

The stream or river.—Its banks; the birds and animals that live near it.

A fish.

A plant.

(c) *The garden and farm in the four seasons of the year.*

The weather and wind.

The soil.—Sunshine, air, rain, frost, manure.

The farmer's tools.—The plough, drill, reaping machine.

The crops.—Grass, corn, root crops.

Wheat.

The potato.

Trees.—Oak, elm, apple, evergreen trees.

An insect.

The spider and his web.

The butterfly.—Colours, beauty, history.

Bees.

The farmer's pests.

The farmer's friends.

A pond.

A frog.

A ramble in a wood, and what may be seen there.

The railway.

Market day in the neighbouring town.

A newspaper.

VI. OBJECT LESSONS IN THE SCIENCE OF COMMON THINGS.

(a) *Water*.—How carried: jugs, bottles, barrels, spouts, funnels. Wells. Things that float: things that sink.

Solids.—Hard and soft, in the room and in clothing. Files, hammer and nails, buttons.

Powders.—Flour.

Pastes.—Paste, clay, putty.

Things porous.—Bread, sponge.

Things that melt.—Butter, tallow, sealing wax, ice, snow.

Water.—Drying clothes, breathing or

slates, frost on pane, the boiling of the kettle, the pot boiling over.

Things that dissolve.—Sugar, salt.

Air.—Bubbles, pouring water through funnel into empty bottle, A burning candle. Fans, blowing feathers, paper windmills.

Forms of strength.—The floor, joists, and boards. Wooden bridges. Steps and stairs.

Things that stretch.—Elastic bands.

Things that bend.—Bow and arrows, cord, ropes.

Machines.—Tops, roller for pastry, for garden, perambulator.

Movements.—Walking, running, leaping, creeping, crawling.

Musical toys.—Harmonicon, bell.

(b) *Water.*—Pipes, taps, the fountain, canals, rafts, boats, anchors.

Solids.—Teeth, nails, and claws, sand-paper, pins, needles, awl, gimlet, hook and eye.

Powders.—Chalk, pencil.

Pastes.—Mud in streets, brickmaking.

Things porous.—Brick, chalk, springs of water.

Things that melt.—Candlemaking, icicles.

Water.—Manufacture of salt from brine. Raindrops, hail, spray, water dust, the cloud.

Things that dissolve.—Manufacture of sugar.

Air.—The chimney, draughts, waves and

breakers, winged seeds, shuttlecock, arrow, and kite.

Forms of strength.—The ceiling, the arch, ladders.

Things that stretch.—A football.

Things that bend.—Cart springs, paper clips, spider's web.

Machines.—Hoop, fly-wheel of sewing machine, mangle, waggon, bicycle.

Movements.—Swimming.

Musical toys.—Musical box, drum.

(c) *Water.*—Siphon, pump, oil, cream.

Solids.—Hinges, tires, and axles. The grindstone. Screws and screw-drivers.

Powders.—Black lead.

Pastes.—Pottery.

Things porous.—Blotting paper, towels, wick, earth.

Things that melt.—Lead, iron.

Water.—Salt lakes. Distillation of water. Clouds and rain.

Things that dissolve.—Crystals, hard water, varnishes.

Air.—The pop-gun, the fire engine, winds, a sailing ship.

Forms of strength.—The roof, railway bridges, cranes.

Things that bend.—Clock spring, chains.

Machines.—The loom, threshing machine, rolling iron rails, coining.

Movements.—Flying.

Musical toys.—Tin whistle, sounds from stretched cord.

VII. MEASURING, WEIGHING, AND TESTING.

A two-foot rule.

Measurements (in inches only). Of length—first by eye, then with rule. Easy measurements of a square—first by eye, then with rule.

Easy measurements of rectangles.

The wire-gauge.

Callipers.

Scales and weights.—Weighing of common objects—first by hand, then with scales; weight in ounces only.

Weighing letters.

Plumb line.

Spirit level.

Steam.—Observations on boiling water; condensation of steam, etc.

Mercury.—Weight of; cf. drop of mercury and drop of water; effect of heat on mercury.

Alcohol.—Effect of heat on it; its evaporation.

Thermometer.—Manufacture, uses, readings in ice, in boiling water, under the tongue, in schoolroom.

A candle.—Its composition, the wick.

Candle under bell-jar over water; candle in narrow-necked bottle.

Chalk.—Where found; its origin.

Chalk.—Its treatment with acid.

Chalk.—Its reduction to quicklime with blow-pipe; lime water.

Sugar heated in test tube; *wood* heated in test tube.

Sulphur heated in test tube; *lead* heated in test tube.

Magnet and iron filings.

The compass.

Two illustrative lessons now follow selected from these schemes. That on the *Sundew* illustrates the special form of nutrition of some plants, and should follow lessons which have dealt with the general form. The lesson is drawn to suit a higher standard, whilst that on the *Sponge* is for a young class.

LESSON ON SUNDEW AND FLESH-EATING PLANTS.

Information.	Teaching Hints.
I. Introduction.	
1. <i>Elements</i> necessary to plant nutrition : C, H, O, N, etc.	Apparatus. —A plant or two of sundew growing in a saucer of water under a bell jar; pressed dried leaf of Venus fly-trap in the two positions; a solution of the ferment obtained from leaves of sundew, butterwort, etc., or, in absence of this, a little pepsin to show its action on fibrin, etc.
2. <i>Uses</i> .—C, O, and H, essential constituents of organic compounds; <i>e.g.</i> , starch, sugar. N used in making proteid matter (protoplasm).	I. All these facts to be elicited by questions recapitulating previous lessons.
3. <i>Origin</i> .—C from CO ₂ in atmosphere. Others from the soil. H and O in the form of water, etc. N in the form of nitrates and ammonia salts.	II. Show a species of fungi. Ask how they know it does not assimilate. No chlorophyll.
II. 1. Some plants have no chlorophyll (as fungi), and so cannot assimilate. They must look for their food stuff ready made, and are either parasites or they feed on decaying animal or vegetable matter .	Take two glass vessels containing water. In the one place some ammonium chloride, and in the other some saltpetre. Stir, and they dissolve rapidly.
2. Other plants grow in marshy soils or in running water soils from which the essential N salts have been washed away. These again have to look for other sources for their food, and are mainly insectivorous . They employ various devices for alluring and catching insects.	Show plant in saucer of water under bell jar.
III. Sundew.	III. 1. Tell this.
1. <i>Distribution</i> .—Three British species, the round-leaved being most common. Found in most sphagnum bogs, and so is most frequent in the north, but also occurs frequently around London.	2. All this will be learned from their observation of the specimen plant.
2. <i>Description</i> .—Little root; small rosette of 8-10 leaves of reddish tint and spoon shaped; numerous glandular hairs, the largest round the margin. Flowers lipped and of a purple colour.	3. (a) Show the specimen grown in the school; it will be in a non-irritant condition.
3. <i>Food</i> .—(a) In a non-irritant condition the tentacles are extended outwards, and in a horizontal position. They are tipped with a shining secretion which sparkles in the sunlight, and so serves to attract insects.	(b) The change in the position of the hairs can be observed.
(b) Fly settles on leaf, and is held by the secretion. The glandular hairs slowly bend over so as to enclose it, and in about ten minutes the fly dies. In a few hours all the hairs are bent over in such a way that the glands lie exactly on the body, even if the fly be on the margin of the leaf. In 10-20 hours the leaf itself has curved over so as to enclose the fly. The secretion now poured out becomes acid, and contains a <i>ferment</i> allied to pepsin. The nitrogenous matter in the body of the insect is thus extracted and absorbed by the leaf.	One leaf ought to have been fed the previous day, and its position could then be compared with the others. Then test the two leaves with litmus paper.
<i>Results</i> .—(1) Movement of the glandular hairs and of margin.	This <i>ferment</i> can be extracted from the leaves by means of glycerine, and it will then digest fibrin. This should be compared with the action of pepsin on food in the stomach. (The action of pepsin on a bit of meat can easily be shown in illustration.)
(2) Chemical action.	It will be seen that the stimulus produces the results opposite.
IV. Butterwort. —Another of our native carnivorous plants. Bears a rosette of about 10 leaves; long, tongue-shaped, yellowish, and covered with a shiny substance. Flies are held by this till the leaf rolls on to the midrib so as to enclose them.	The plant can be cultivated easily enough in a saucer under a bell jar, and will produce seeds; but these are neither so many, nor give rise to such vigorous seedlings, as if the parent plant be fed on meat or flies.
V. Venus Fly Trap. —Closely allied to our Sundew. Occurs on marshy moors of the two Carolinas. Lamina of leaf divided	IV. Show specimen, if possible; if not, picture of one. These facts will then be learned from observation.
	The acid from the ferment is in an irritant condition, and will curdle milk.
	V. Show a specimen, and have these facts learned from observation.
	Touch the bristles, not gently, and note result. The two halves of leaf come together with great rapidity, and the stiff outgrowths fold over and interlock like fingers, thus preventing escape.
	VI. A visit to Kew or kindred places will be necessary to see this plant.
	Show a picture (good ones are done by the publishers), and let as much of the information as possible be learned from an examination of the picture.
	What is the function of the downward

LESSON ON SUNDEW AND FLESH-EATING PLANTS—*continued.*

Information.	Teaching Hints.
<p>into two deeply segmented halves, connected by the midrib. On the upper surface of the leaf are half a dozen bristles. On the edges of the leaves are some stiff outgrowths.</p> <p>VI. Pitcher Plant.—Found in Madagascar and Ceylon; a climbing plant. At the ends of the tendrils are pitcher-like growths, and these pitchers are protected with lids. They have various devices for alluring insects, such as honey glands. In some species the interior of the pitcher is so smooth that the insect cannot get foothold, and so falls into the liquid at the bottom. In other species there are a number of hairs pointing downwards. When an insect falls in, copious secretions are poured forth.</p>	<p>hairs?—They prevent the insect getting out.</p> <p>What is the effect of the secretions?—They convert the fly into a kind of soup which is absorbed by the plant.</p> <p>Recapitulate.</p>

NOTES OF A LESSON ON A SPONGE.

Time—Thirty minutes. *Class*—Standard I.

Apparatus—Sponge, saucer and water, india rubber, piece of flannel, piece of calico, a stone, and a lens.

Aim—To show the suitability of a sponge for its uses.

Matter.	Method.
<p>I. Introduction.</p> <p>II. Its Uses.</p> <p>1. For home purposes :—</p> <p>(a) To wash our faces.</p> <p>(b) For sponge baths.</p> <p>(c) To clean glass, etc.</p> <p>2. For school purposes :—</p> <p>(a) To clean slates.</p> <p>(b) To clean swing slate or B.B.</p> <p>III. Properties.</p> <p>1. Light.</p> <p>2. Soft.</p> <p>3. Compressible.</p> <p>4. Very elastic.</p> <p>5. Porous.</p> <p>6. Absorbent.</p> <p>7. Tough.</p>	<p>I. Show a piece of sponge. Ask children to name it.</p> <p>II. All this information should be obtained from the children :—</p> <p>1. (a) By <i>questioning</i>, and by appealing (b) to their <i>experience</i>. All this should (c) be done in a <i>conversational</i> method.</p> <p>2. Show a small slate sponge and a large one for the swing slate or B.B. Ask children to name their uses.</p> <p>III. 1 and 2. Let the class <i>handle</i> it; it is <i>soft</i>. Let them weigh it in their hands; it is <i>light</i>. Again, let the children take a stone in one hand and the sponge in the other; the sponge is <i>very light</i>. Place it in the <i>saucer of water</i>; it floats. Why? Because it is <i>light</i>. Rub it against the face; it is pleasant. Why? Because it is <i>soft</i>; hence <i>suitable for washing</i>. Is the stone suitable? No; because hard and painful to the skin.</p> <p>3. Let the class <i>look</i> at the sponge. It (is full of holes. Tell the class (if (necessary) that these are called pores, and the sponge is said to be <i>porous</i>.</p> <p>Place it in the saucer of water. It sucks up the water. Where is the water? In the holes. Compare with a piece of flannel and a piece of calico. Both are porous, but not to the same extent. Refer to the <i>pores of the skin</i>. Place a magnifying glass over their hands and call attention to the pores.</p>

NOTES OF A LESSON ON A SPONGE—*continued.*

Matter.	Method.
<p>IV. Natural History.</p> <p>An animal substance found in the sea and in fresh water. Men get it by diving deep into the sea. Some of the commoner kinds are dredged from the bottom of the sea. Some are hard like flints, and are therefore of no use.</p>	<p>Take the sponge out of the water; squeeze it; call attention to its size. Open the hand. It resumes its former size again, hence it is like india rubber; <i>elastic</i>. <i>Illustrate</i> with a piece of india rubber. Then note we can squeeze out the dirty water, and it is then ready to take up fresh clean water, hence it is <i>suitable for washing</i>.</p> <p>7. Let the class pull it. It does not tear easily. <i>Show</i> a piece of <i>leather</i>, and let the class pull that. It is <i>tough</i>. Yet we do not wash with leather because it is hard and not porous enough. Then anything suitable for washing must be <i>porous, soft, and elastic</i>.</p> <p>IV. <i>Tell</i> this. <i>Show picture</i> in illustration. Explain "dredged". Refer to the Thames dredgers. Show a hard specimen if possible. Ask why useless.</p>

EXAMINATION QUESTIONS.

- 1.—Make a list of twenty lessons on familiar animals, and explain the order in which you have arranged them.
- 2.—Name the qualities you would select in giving an object lesson to infants on "steel," and state the experiments or illustrations by which you would elicit the ideas, before giving the names of the qualities.
- 3.—Detail the apparatus required for lessons on a coal mine and on the seasons, and draw the diagrams required for the latter.
- 4.—Point out some of the uses of object lessons in infant schools, and illustrate your answers by short notes of a lesson on the "whale" or on "iron".
- 5.—Write out brief notes of a lesson on "glass," and explain your purpose in teaching the names of its qualities.
- 6.—Make out a list of lessons on "common things," illustrative of the pressure of the atmosphere, and give brief heads of one of such lessons.
- 7.—What is the advantage to young children of having lessons on such subjects as a spider, wool, sugar? Enumerate the qualities or peculiarities in each case to which you would specially direct their attention.
- 8.—In giving an object lesson, what is the aim of the teacher in using terms denoting the qualities of the object? What is meant by vulgar and pedantic language?
- 9.—What sort of lessons do you understand to be intended by "phenomena of nature and of common life"? Make a list of twelve such lessons adapted for children in the First Standard.
- 10.—What sort of a sketch should appear on the B.B. at the end of a collective lesson on *one* of these subjects: (a) Iron; (b) Corn; (c) The Ocean; and what is the best use to make of such a sketch when it is written?
- 11.—Show what is the proper use of the B.B. as an aid to recapitulation. Give a specimen of the sketch which should appear on the board at the end of an object lesson.
- 12.—Sketch out a course of lessons on common objects, or on the phenomena of daily life, suitable for children in Standards I., II., and III.
- 13.—What is an object lesson? Show that mere sight is not necessarily knowledge.

CHAPTER VII.

KINDERGARTEN.

I. What it is.—Kindergarten is an educative system of play-productive play—with a purpose. There is little direct instruction in it, but the children are amused, interested, and taught to observe, think, and manipulate through the medium of toys (gifts) and play (occupations). It strives to develop every faculty a child possesses; to develop power, rather than to store knowledge; to enable the child to educate itself, and to generate the desire to do this.

II. Its Advantages.—It possesses advantages belonging to each branch of education—intellectual, physical, and moral.

1. Intellectual Advantages.—It aims to utilise a child's natural promptings, to produce accuracy as a habit, to cultivate observation, to teach the child to think, to make it skilful, and to produce pleasure through a right use of its budding intellectual powers.

2. Physical Advantages.—The rhythmical movements, the dancing, the singing, and the games, are all physically beneficial. The child's natural love of activity, curiosity, and play is noted and utilised. The health is improved, and consequently the mind is strengthened. The limbs are exercised and developed, whilst the eye and the ear are brought into disciplined use.

3. Moral Advantages.—Lessons of care, neatness, accuracy, order, love of work, kindness, truthfulness, obedience, and the beautiful, both in nature and in human conduct, are all inculcated. Furthermore, it is the proper nursery of that improved objective teaching which is now so materially leavening our educational system by increased Object Lessons, by Drawing, by various forms of Manual Instruction, and by Technical Education.

FROEBEL'S GIFTS. I. Play.—These were a species of *plaything* out of which the children constructed various objects by way of

instructive amusement. The *games* were accompanied by songs and dancing, both of which are valuable adjuncts to the system. The gifts were really sedentary games enlightened by dance and song, and his motto was: "Let us live for our children".

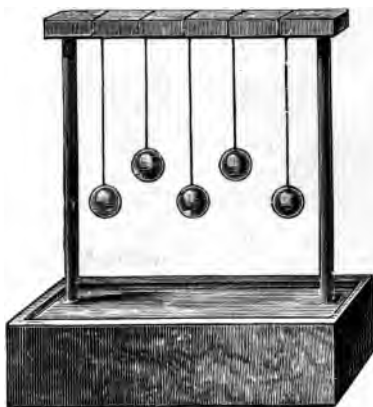
II. Song.—These were peculiarly suited to child life. They dealt with incidents of child life, or incidents of the material world around them which came within the comprehension of child life. Some little story was embodied of the pet animal kingdom, or kindred things, and mimicry or work of some kind generally accompanied the song.

III. Dance.—These movements were a great improvement upon the ordinary stiff semi-military movements of school drill. Various actions were performed as in musical drill. A great variety of attitudes were required, and so the body was made lithe and strong. The æsthetic and disciplinary effects of the movements were also very important, as the children got good ideas of regularity and harmony.

IV. Gifts.—There are seven of these due to Froebel, but the system has been largely expanded and developed by others.

1. First Gift. The Ball.

(a) **Materials.**—It consists of a number of balls (worsted) all of the same size and of different colours. To each ball a string is attached, by which the ball may be suspended. The colours are usually half primary and half secondary.



(b) Aim.

1. To train the eye in colours.
2. To exercise the limbs in various ways.
3. To teach directions right and left.
4. To teach properties generally (hard, soft, etc.).

The ball or sphere is chosen for the first gift on account of its simplicity of form; there are no angles and no differing dimensions. The impression made by a sphere is a *single one* and the view is always the same.

(c) **The Game.**—*Various movements* are made with the ball. It is raised and lowered; moved to the right and then to the left; passed from one hand

to the other; from one child to the other. The *rate* of movement also varies, being sometimes quick and sometimes slow, according to the word of command. These orders must be smartly, neatly, and simultaneously executed.

(d) Its Advantages.

1. The four mentioned under the head of **Aim**.
2. **Fellowship**.—The children act together, and so develop a sense of fellowship.
3. **Pleasurable Association**.—The teacher is gentle, and enforces gentleness from the children. This sets up an association between play and work, between teacher and class, which is pleasurable.
4. **Selfishness Repressed**.—The class has to act together. No child does what it likes, although it may like what it does. The training of the game is for *all*, not for one. Class sympathy is invoked, emulation is stimulated, but there is no competition for prizes.
5. **Temper**.—Children like working together. The solitary task is rarely liked by a young child, and impotent effort is both discouraging and souring. Class action avoids this.

2. Second Gift.

(a) **Materials**.—This gift consists of the sphere, the cylinder, and the cube.

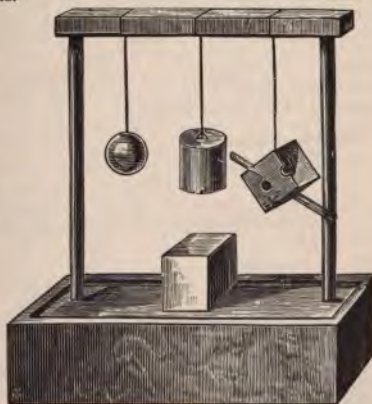
(b) Aim.

1. To teach from.
2. To aid the child's natural power of observation, and to help him to discover for himself the similarity and dissimilarity existing between different objects.
3. To give the use of right terms.

(c) **The Game**.—The sides, corners, edges, etc., of the cube are pointed out, explained, and counted. The sphere, cylinder, and cube are contrasted in shape, and so a difference in their properties is deduced. The children are asked to note that the cube and the cylinder vary according to the point from which they are viewed. As each property is distinguished, the proper terms are given and fixed in the minds of the children.

(d) Advantages.

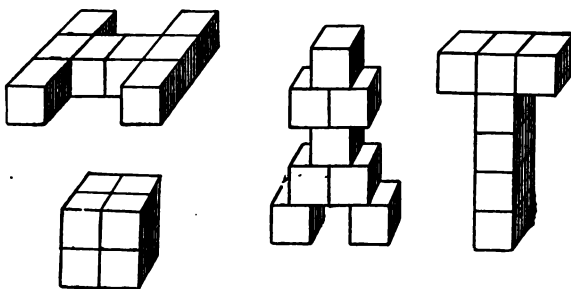
1. The "gift" passes from the simple perception of the sphere to the perception and recognition of differences; *e.g.*, sides, lines, surfaces, circumferences, etc.
2. It gives a large amount of actual instruction in the accepted meaning of the word.
3. The facts and relations on which geometrical truths are founded are now made familiar.
4. A good mental training is given.
 - (1) The habit of accurate observation is encouraged.
 - (2) Reasoning from one fact to another is demanded.
 - (3) The perception of necessary relations is taught.

*3. Third Gift.*

(a) **Material**.—A cube consisting of eight smaller cubes, and generally called the *First Building Box*. For the use of the children there is a wooden box containing the eight smaller cubes, each of one inch side. Those for the use of the teacher should be larger.

(b) Aim.

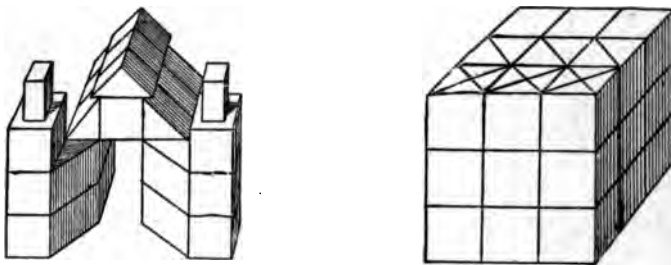
1. To teach number ; to give the idea of whole and part.
2. To develop constructive power.
3. To teach lessons of symmetry.

(c) The Game.—The child manipulates the small cubes in various ways,

adding them, and taking them away, and so discovers the practical truths of the elementary rules. The things are then named, and some short formulæ may be given. The child is encouraged to put its observations into words. A series of lessons can be given, and various objects may be constructed, such as a table, bench, door, window, steps, castle, clock, chair, etc. The lesson is aided by any anecdote, or any facts of natural history which the objects may suggest. Then after each *set* lesson, the children should be allowed to build according to their own fancy.

(d) Advantages.

1. **Utility.**— Objects of everyday use are manufactured, and so the children become familiar with their structure and uses.
2. **Beauty.**—The bricks are all symmetrically laid, and the completion of each object gives a sense of order and regularity.



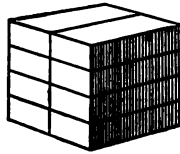
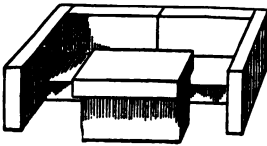
3. **Mental.**—Fresh observations, the perception of similarities and differences, analogies and contrasts, are made.
4. **Interest.**—The arousing of the child's interest is very obvious. Heart and soul is put into the work, and a pleasant and valuable association is set up between work and school.
5. **Originality.**—This is called forth and stimulated. The child is allowed to act independently, and this gives scope for original constructive efforts. The delight and value of such work are considerable.

4. Fourth Gift.

(a) **Material.**—A cube which is divided into eight oblong bricks. It is called the *Second Building Box*. Length = twice the breadth. Breadth = twice the thickness.

(b) **Aim.**

1. To advance upon former lessons, and to give more exercises in building and pattern forming.
2. To give the child the power of selecting the right side.



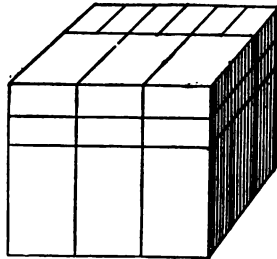
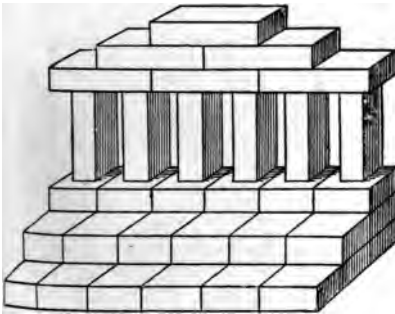
(c) **Game.**—This is much like the last. The child is still amused with its instructive and constructive play. The children first build from the teacher's dictation, and then from their own ideas.

(d) **Advantages.**—It begins a new series of observations of lines and pictures. The third and fourth gifts may be very usefully combined, and a number of advanced and constructive figures can be built. It is recommended that this combination be made before passing over to gift five.

5. Fifth Gift.

(a) **Material.**—*Third Building Box*. It consists of a large cube divided into twenty-one whole, six half, and twelve quarter cubes.

(b) **Aim.**—This gift is really an extension of the third gift. Its aim is to add the study of oblique lines, obtuse and acute angles, to the former lessons.



(c) **Game.**—The same process of training is followed as before. New combinations and fresh objects are formed.

(d) **Advantages.**—Owing to the more complex nature of the gift, all the advantages of the third gift are enhanced.

6. Sixth Gift.

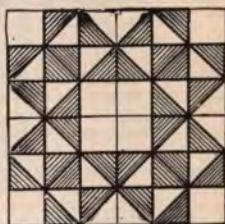
(a) **Material.**—This is the *Fourth Building Box*. There is a large cube, which is divided into eighteen whole and nine small oblong bricks.

- (b) **Aim.**—To develop more building exercises and symmetrical forms.
 (c) **Game.**—It is really an extension of the fourth game.
 (d) **Advantages.**—The advantages of the fourth gift will be increased and extended, since the combinations practised are more complex and advanced.

7. Seventh Gift.

(a) **Material.**—This consists of planes of polished wood in two colours. There are five boxes, each of which contains a certain quantity of surface objects, *e.g.* :—

A	contains	64 squares.
B	"	64 right-angled isosceles triangles.
* C	"	54 equilateral triangles.
D	"	64 right-angled scalene triangles.
E	"	64 obtuse-angled triangles.



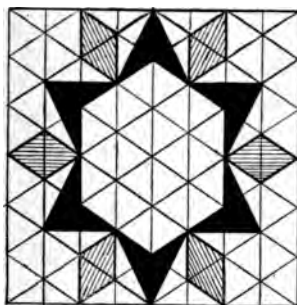
(b) **Aim.**—Bretsch says the seventh gift has immense capabilities. What they are will appear in the details that follow. Unfortunately, "much of its force and value has been lost for want of systematic form and sequence in the tablets". It is designed to extend the child's knowledge of form and colour by introducing new combinations.



(c) **Game.**—Here there is a series of well-graded games.

1. **The Square Tablet.**—This is a type of four-sided figures. It is given first because it is the simplest of all four-sided figures. The square is the type of all quadrilateral figures.
2. **Equilateral Tablet.**—This is presented next because it is to triangles what the square is to quadrilaterals.
3. **Isosceles Tablet.**—Take a "square" and divide it from corner to corner. We get an isosceles triangle.

4. **Scalene Tablet.**—Draw a line bisecting one angle of the equilateral triangle, fold the triangle on this line, and we get the scalene triangle.
5. **Obtuse Tablet.**—Place two scalene triangles base to base, and we get the obtuse tablet or triangle. Thus in the seventh gift there are five forms, and these are capable of unlimited combinations.
- (d) **Application.**—Their application is chiefly artistic and mathematical.
1. **The Square.**—This educates the eye to judge correctly of two very important angles, 90° and 45° , and both of which are of immense importance to the artisan, draughtsman, and to designers. This can be seen from the fact that it gives us the T-square, and it forms part of each of the "set" squares.



2. **Equilateral Triangle.**—This has three angles of 60° , and six of them just fill a *circle*.
3. **Scalene Triangle.**—This has angles of 90° , 60° , and 30° . The children must be made subsequently to understand that these are not the angles for *all* scalene triangles. These angles give us another of our "set" squares, and the triangle is very useful in drawing the *hexagon*, as the 45° is useful in drawing the *octagon*.
A child then knows all the chief angles of design and manufacture— 90° , 45° , 60° , and 30° .

The above constitute the seven gifts of Froebel's system; but the gifts have been largely expanded of late years, so that now we have stick laying, stick plaiting or interlacing, wood and cork work, rings, drawing, perforating, embroidery, sewing, paper cutting, paper folding, cardboard work, modelling, and others. Each of these is intrinsically very interesting, and each has its special educational value.

VARIED OCCUPATIONS.—A little misapprehension sometimes exists in the minds of young teachers as to what are varied occupations. The following is an official list;—

Ages Three to Five.	Ages Five to Seven.
<ol style="list-style-type: none"> 1. Games with music. 2. Games without music (guessing games, etc.). 3. Recitations (nursery rhymes). 4. Picture lessons (learning to answer in complete sentences as to what they can see in a picture). 5. Paper folding. 6. Mosaic with coloured tablets. 7. Drawing. 8. Matching colours (picking out the same shades of wool from a heap of remnants). 9. Plaiting paper. 10. Working patterns with needle and worsted. 11. Threading beads in twos, threes, etc. 12. Arranging shells in twos, threes, etc. 13. Arranging "pictures of number" with cubes. 14. Wood building. 	<ol style="list-style-type: none"> 1. Games with music. 2. Games without music. <ol style="list-style-type: none"> (a) Guessing Games, etc. (b) Taking messages. 3. Picture lessons. 4. Object lessons. 5. Story lessons. <ol style="list-style-type: none"> (a) Stories from history. (b) Grimm's <i>Household Tales</i>. 6. Recitations. 7. Paper folding. 8. Mosaic with coloured paper; use of gum. 9. Drawing; brush drawing. 10. Plaiting paper. 11. Ruling simple geometrical forms. 12. Measuring and estimating length. 13. Weighing; estimating weight. 14. Setting a table. <ol style="list-style-type: none"> (a) Carrying a glass of water without spilling it. (b) Moving cups without breaking them. 15. Modelling in clay. 16. Basket work. 17. Cutting out patterns and shapes with scissors. 18. Wood building. 19. Number pictures, with cubes, beads, etc.

COLOUR.—All knowledge commences through the senses by sense impressions; hence these lessons should begin at the threshold of school life. Colour should be *taught before form*, because—

1. It is more attractive to children.
2. It is a refreshing change from other work.
3. It is more simple than form. The recognition of colour is a simple sensation, whilst the recognition of form involves more than a simple sensation.

I. Stages.—There should be three stages.

1. To Distinguish Colours.—This should be confined to the three primary colours, red, blue, yellow, and should be the work of the babies.

2. To Match and Distinguish two shades of the same colour.—The shades selected should be widely apart.

3. To Harmonise Colours.—To fill in two or three shades between two extremes.

II. How Taught.—These lessons can be given in various ways:—

1. By Contrast and Harmony.—The colours can be put one against the other in such a way as to illustrate both these principles.

2. By Reference.—Flowers, articles of clothing, etc., can be referred to, Worsted balls, ribbons, beads, marbles, hair, eyes, chalks, etc., also,

3. By Kindergarten Gifts.—Several of the gifts lend themselves to this purpose, whilst colour sheets, pictures, and ravelling may all be utilised. Tablet laying, perforating, embroidery and sewing, paper cutting and paper folding, weaving, or paper plaiting, etc., all assist.

III. Apparatus.—This will depend on the nature and method of teaching employed, but the following are recommended :—

1. A sheet of coloured squares showing—
 - (a) Black and white.
 - (b) Primary colours.
 - (c) Secondary colours.
 - (d) Common shades of different colours.
2. Loose cards coloured in the same way.
3. Coloured wools and textile fabrics.
4. Coloured pictures.
5. A set of small drawing models painted in different colours.

IV. General Principles. Plan of a Lesson on a Secondary Colour.

1. Experiment and Observation.

- (a) *Mix* the two primary colours which form it, *e.g.* :—

Red and blue mixed give purple.
 Red and yellow „ orange.
 Blue and yellow „ green.

Do not tell the children what will happen. Let them *observe* carefully, so that they may see the result for themselves. This will ensure *interest* and *attention*.

- (b) Use a *prism*. Decompose light by the aid of a prism, and throw the colours on the wall. Of course, a suitable day is wanted.

2. Judgment.

- (a) Get the children to *select a shade* between two other shades, to point out a lighter or darker shade than the one pointed out by the teacher.
 (b) As a further exercise, they could have a number of colours submitted to them in a convenient way, which they should be asked to *contrast*. The shades in the clothing of their class mates would afford other illustrations.
 (c) As the colours are learned, the children should be required to *match* the loose cards from the coloured squares, or *vice versâ*.
 (d) They should then be asked to *name* familiar objects of colour under observation.

3. Harmony.—To teach harmony, accustom the eye of the child to good instances of it. Avoid inharmonious combinations in all lessons, and, if possible, in the colour of the school walls.

Form.—Lessons on form are better instruments for education than lessons on colour; but they are harder, and therefore follow colour. There is much in child school life that can aid the teacher in these lessons, such as kindergarten occupations, slates, pencils, some of the school furniture, the B.B., and books.

1. Language.—The teacher must be careful of his phraseology. *Technical terms should be avoided.* The child wants to learn the *objects*, not the names without the objects. For this purpose simple descriptive language should supersede technicalities until a later lesson, since a child may be able to recall an object, but fail to recall its difficult name.

2. Size.—Size should be taught first. Children readily perceive the different bulks of different bodies. Most answers will only be approximately right, and

the difficulty increases with difference of form and equality of bulk. The objects should be placed before the children, compared with some common standard, and their judgment should be invited and corrected where necessary.

3. Dimensions.—This would naturally lead on to the teaching of dimensions. Objects of similar shape are larger or smaller than each other, according as they are longer or shorter, broader or narrower, etc., and so the terms *long and short, broad and narrow, high and low, thick and thin, deep and shallow, are learned.* School objects will furnish plenty of material for this, whilst variety can be obtained by references to outside materials and buildings. In most cases—all where possible—the children should actually measure the objects themselves, for which purpose flat wooden rulers should be supplied to them. The synonymy of height and depth should be illustrated.

4. Positions.—Lines may be drawn on the B.B. in one position, in two, and in three—the upright, the lying down or level, and the slanting. These can then be *mixed* and the class tested. The children can be asked to put their books or pencils, etc., in the various positions. They can then draw the lines on their slates to the teacher's *dictation*. Drawing can also be done from *imitation* on the B.B., the teacher gradually building letters like I, H, T, L, E, F, embracing perpendicular and horizontal lines (uprights and levels), whilst X, W, V, M, N, Z, introduce the slanting line.

5. Curve.—The *curve* will follow. It is already a familiar shape to the children. Balls, marbles, apples, oranges, coins, crockery, wheels, clocks, watches, etc., are known, and can be utilised as illustrations.

The *capital letters* like C, G, J, O, Q, B, R, D, S, can be introduced, and their elements analysed. The children might then try to copy them. Some teachers recommend the *petals of flowers* for the teaching of form and colour, but there are difficulties which make their use doubtful, at least for form, for young children. The supply of flowers would be one, the varied forms of the petals another, the difficulty for young children of folding out the petals to their true shape another; but, where practicable, the exercise could be made very interesting.

6. Surface.—This could now be taught from the observation of flat and spherical bodies.

Drawing.—This is one of the most *interesting* and most *instructive* of the many gifts of the kindergarten method. Its connection with *writing* has already been pointed out, but it possesses other advantages over and above this. It is the first step to *design*, and the improvement of design is very necessary for the maintenance of some of our manufactures. It is an essential to many occupations; it encourages and develops *observation*, cultivates the *graphic memory*, exercises the *imagination* in the construction of design, cultivates the *perceptive faculty*, and gives a *delicacy of manipulation* which is very valuable. Furthermore, *description* appears in its most successful form in drawing, for the most gifted writer cannot present a scene like a picture, which always appeals to the understanding and the emotions more rapidly and more successfully than any word description. It develops the *æsthetic emotion* by raising the tastes of the people. Good works of art may and often do become objects of enjoyment where the drawing faculty has been cultivated, whilst *habits of care, neatness, and accuracy* are produced which must react upon the general character,

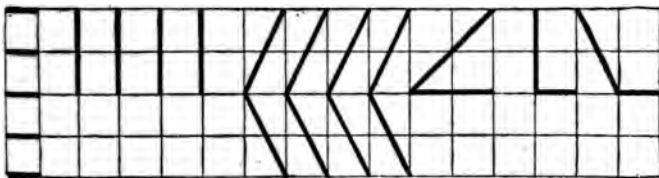
Apparatus.—Graduated *slate cards* should be used in the earliest classes, *squared paper* for the higher classes, and the whole work should be based on Froebel's system. Where Mulhauser's system of writing is taught, the squares are a training for the use of the rhomboids. A *chequered B.B.* will be necessary for demonstration. The work might be divided into three stages.

1. First Stage.--Squared slates and paper are recommended for the following reasons :--

- (a) To guide the child's hand.
(b) To give the first ideas of length and proportion.

This stage deals only with the length and direction of straight lines and common angles. The exercises should be graded thus:—

- (a) Level (horizontal) lines.
(b) Upright (perpendicular) lines.
(c) Slanting (oblique) lines.



Common simple terms should be used first, the technical names being given afterwards. Alternate lines are then drawn through two spaces, and the perpendicular and horizontal are brought near to each other for comparison. Oblique lines are similarly treated, and the process is continued until the lines run through five squares. The *common angles* could then be taught. They could be spoken of as small corners (*acute*), large corners (*obtuse*), and (*up*)-right corners.

2. Second Stage.—In this stage, the lines are grouped to form figures in various positions. *The figures are geometrical, like the right-angled triangle, the square, and combinations of these; e.g., two right-angled triangles may give a square; a series of squares of graded sizes joined together give steps; and so on.* The children thus get their first idea of design by learning the analysis and synthesis of common geometrical figures. This method of teaching offers large scope for figure building, and is very interesting to children.

3. Third Stage.—Further combinations are made in this stage. Larger and more complicated figures are given, and simple, pretty, straight-lined designs are sometimes the result. The children might also be left to their own ingenuity now and then to devise designs of their own. The system also lends itself readily to *dictated* and *memory* drawing.

EXAMINATION QUESTIONS.

- 1.—Give the heads of a lesson on the three principal colours, and say what objects, pictures, or apparatus you would need to make such a lesson interesting and useful.
- 2.—Describe the best system you know for teaching form and colour.
- 3.—Explain the terms kindergarten, Froebel's gifts, and state fully the educational use of the second and fourth gifts.
- 4.—Detail some of the geometrical properties that may be taught to young children by folding square or rectangular pieces of paper, and give illustrative diagrams.
- 5.—Give examples of kindergarten exercises that may be used to stimulate invention and imitation in young children.
- 6.—Enumerate Froebel's seven gifts, and show the progressive nature of their lessons.
- 7.—For what purposes are lessons on form and colour given to infants? Name the order in which the principal plane figures should be taught.
- 8.—Describe the earliest lessons in drawing which would be given in an infant school.

9.—Of all the different employments now used in infant schools, besides the learning of reading, writing, and arithmetic, which do you consider most useful and interesting, and why?

10.—The Code requires that "appropriate occupations shall be provided for children in an infant school, besides instructions in reading, writing, and arithmetic, and in common objects". What are the best of these "occupations," and what educative purpose do they serve?

11.—In what order would you use the kindergarten "gifts" in an infant school? How should the lessons be conducted so as best to exercise the intelligence and observation of the children?

12.—*Notes of Lessons.* The square and its properties (I.).

13.—"It should be borne in mind that it is of little service to adopt the 'gifts' and mechanical occupations of the kindergarten, unless they are so used as to furnish real training in accuracy of hand and eye, in intelligence and in obedience." Explain and illustrate this passage, and show how a teacher can best give effect to its recommendation.

14.—Describe a good lesson on colour adapted for an infant class, and say what illustrations you would get together before giving such a lesson.

15.—Say how you could, either by paper folding or by simple drawing, make the properties of a square visible to young children, and explain what are the uses of such a lesson.

16.—Taking a square of paper, what simple ideas of form can you impress on a class by folding a paper so as to make a single crease in it?

CHAPTER VIII.

ARITHMETIC.

In the Revised Instructions issued to Her Majesty's Inspectors, it is stated that many experienced teachers believe that the true progression in Arithmetic is not to be found in advancing from addition and subtraction to multiplication and division, with the large numbers often given in sums; but in graduated exercises beginning with small numbers and exhausting all their combinations. Such teachers will take, for example, the number twenty, and, after helping the scholars to count cubes or other objects, will dissect the number, find out in how many ways it is made up, learn its fractions and aliquot parts, apply it to money, length, hours, and minutes, and perform all the arithmetical processes, both orally and in writing, which can be dealt with within that limit, higher numbers and more elaborate exercises in notation being reserved to a later stage. Whether this course be followed or not, the reasons of arithmetical processes should be properly explained and understood, for this is a department of school work which has been much overlooked. There is in an elementary school course scarcely any more effective discipline in thinking than is to be obtained from an investigation of the principles which underlie the rules of Arithmetic. When children obtain answers to sums and problems by mere mechanical routine, without knowing why they use the rule, or when, on receiving a question or a problem, they ask, "What rule is it in?" they cannot be said to have been well instructed in Arithmetic.

It must be remembered that Arithmetic is both an art and a science, the former being all-important for practice and the latter for training. The science deals with the properties and principles of numbers, discovers their truths, and hands them over to the art which applies them. Each has its value; but when Arithmetic is all art, as it often has been in some schools, it then becomes a mere imitative or mechanical process, and quite useless as a

means of training—its highest value. It will thus be obvious that for the efficient handling of the subject it must, like Grammar, be taught inductively and applied deductively. Every new rule or truth should be taught by this inductive method; nor should the rule be applied to the working of examples until the reasoning underlying those truths is perfectly clear to the class.

Good teaching will seek to reduce the labour involved in the work to a minimum; to supply easy and short rules, clear and intelligent methods, sufficient and suitable explanations, backed by well-chosen examples. The newer and abbreviated methods will enable the teacher to get rid of cumbrous operations, which breed fatigue and disgust for the subject. Assistance will be so given as to encourage self-effort; the methods of teaching adopted will strengthen concentration, which is all-essential in Arithmetic; and it will insist upon the work being set out in a neat, legible, and clear style, whilst numerous suitable exercises will ensure rapid and accurate computations and solutions.

ADVANTAGES OF TEACHING ARITHMETIC.

1. Reasoning.—It is a fine aid towards building up the reasoning powers, being both inductive and deductive in its teaching. A small number of fundamental propositions is laid down, consisting of such definitions as “Two is one and one,” “Three is one and two”; or such axioms as “The sums of equals are equal,” or “The differences of equals are equal,” and from these propositions are derived a large number of truths and applications of truths. Arithmetic makes the mind precise and accurate in its statements and judgments, and gives an orderly turn to it. By its aid the pupil learns to distinguish between the essential and the non-essential, and, generally, it supplies him with some necessary materials and training for scientific reasoning; and, finally, as it deals largely with abstract numbers, it assists considerably in developing the power of abstraction.

2. Truth.—It is an enemy to fallacies. Under its influence the pupil learns to accept nothing without a clear reason capable of demonstration. Some urge, however, that a too exclusive devotion to the wider subject of mathematics gives a wrong bias of mind respecting truth generally; and although what is true of mathematics is largely true of arithmetic, nevertheless there is no fear of falling into this misfortune in an elementary school. We learn from Mill the reasons why the primary truths of mathe-

matics seem to have a greater certainty than other inductive truths:—

- (a) **Their Universality.**—They are true of everything, everywhere, and at every time.
- (b) **Their Extreme Familiarity.**—The perception of their truth only requires the simple act of looking at objects in the proper position, and often only thinking of them in such a position. Hence exemplifications of their truth are incessantly presented to us.
- (c) **The Absence of any Analogies to Suggest a Different Law.**—This is very important. If everything in the universe always maintained a condition of absolute rest, we might find as much difficulty in conceiving the possibility of the sun falling from the sky as we now have of conceiving that two straight lines can enclose a space.
- (d) **They are Never Counteracted,** being independent of causes.

3. Attention.—It is a fine aid to concentration, depending for its success upon the undivided attention of the pupil.

4. Emotional Effects.—It is generally *popular* with children, especially with those who can master its difficulties readily. There is a consciousness of *power* following success, an intensified *interest of pursuit*, a rebound of *intellectual pleasure* over some problem solved. Its many devices for solution arouse *wonder*, and the capacity to deal with its problems gives a healthy *self-esteem*.

5. Its Practical Uses.—These are so obvious as to scarcely need mention. Apart from the training and discipline supplied on the inductive side, it forms a necessary qualification for everyday life, and especially for the shopkeeper, the merchant, the clerk, the engineer, surveyor, astronomer, accountant, and many other callings.

NOTATION.—The teaching of notation to very young children requires much care and skill, for it involves the difficult transition from the concrete to the abstract. Such concrete objects as kindergarten sticks, cubes, the ball frame, lines or dots upon the B.B., picture numbers or money, are now invariably used, so that this branch of school work is taught on more scientific methods than formerly. Constant reference is made to the apparatus, and, where possible, the children are allowed to manipulate the objects themselves; and although the very large classes in many of our modern schools make this manipulation a serious consideration both as to time, expense, and discipline, still it is based upon a principle of child life, and should be adopted even in the face of difficulties. The arithmetic then affords training for both hand and eye, and both kindergarten sticks and picture numbers afford opportunities for this kind of teaching. For this reason, where such things are available, and one kind at least

ought to be available in every school containing young children, it is recommended that the lessons be given with their aid.

The Numbers from 1 to 9.—Taught with kindergarten sticks. Several lessons will be necessary. The skill of the teacher is the deciding factor rather than any fixed division of lessons.

First Lesson.—Have 5 sticks distributed to each child. At a subsequent lesson the whole 9 could be given out.

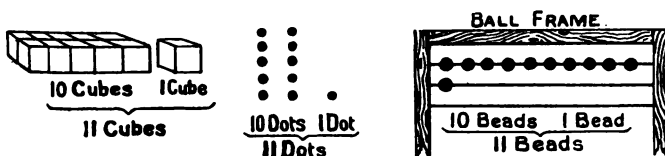
1. (a) The teacher holds up *one* stick, and says *one stick*, the children repeating while lifting up one stick each. *The number name is thus associated with the object.*
- (b) Now show one cube, one finger, one marble, etc. In each case the children repeat one cube, one finger, or one marble. The object is to *accumulate instances.*
- (c) Now place a dot or a line upon the B.B. The children again say "one dot" or "one line". They should be asked to make a dot or a line upon their slates. Then put the figure one (1) on the B.B. Let them make it upon their slates. Tell them that it represents 1 stick, 1 cube, 1 marble, etc. Impress upon them the fact that 1 always means 1 something. The object is to get them to *recognise the written symbol for 1.*
2. Hold up a *second* stick in the other hand. The children recognise it as *one stick*, and say so. They notice that you have one in each hand. They then take up another stick themselves, imitating you. Transfer both sticks to one hand, the children again copying. Now tell them that *one stick* and *one stick* make *two sticks*, the children repeating as before. Now make another dot or line upon the B.B., beside the first one. How many dots now? Repeat with other objects. Then make a figure 2 on the B.B., let the children copy on their slates, and again make them understand that this figure stands for *two something*—sticks, cubes, balls, etc. Then *exercise* the class in picking out two things about the room.
3. Proceed in the same way with the other numbers, remembering that as the numbers increase in value fewer should be taken for one lesson, because a greater variety of simple arithmetic exercises may be worked from them.
4. Make use of the sticks to perform simple exercises in the simple rules; e.g., let children take up 3 sticks in one hand and 2 in the other. Then transfer them to one hand. Count them—thus 2 and 3 make 5. Such exercises as $4 + 1$, $3 + 2$, $2 + 2$, $2 + 1$, etc., could be worked in the same way; or $5 - 4$, $4 - 2$, $3 - 1$. There are 2 twos in 4, 5 ones in 5, 5 ones make 5, and so on.

Numbers from 10 to 20.—Still taught by kindergarten sticks, but now each child will require two bound bundles of sticks, each bundle containing ten, and ten separate individual sticks also. This will be a big demand where the classes run to sixty, but it should be met if possible. The bundles should be strongly bound.

1. To Teach 10.—The teacher picks up 10 sticks one at a time, the children imitating and naming as the groups increase up to 9. When the *tenth stick* is reached give them the new name *ten*. Let them show their 10 sticks and name them. *Vary the instances* again, and let the children count and name in each case. Now write the symbol 10 on the B.B., let them write it on their slates, and make them understand that this represents *ten* somethings. Plenty of *exercise* of the kind specified now should be given.

2. To Teach 11 and 12, etc.

- (a) Let the children take up a bundle of sticks each, and count the number of sticks in each bundle—10. *Then one bundle is equal to ten single sticks.* Take up a bundle in one hand and a single stick in the other. Class imitate. Transfer both to one hand. How many sticks has each one now? 10 and 1. Tell them 10 and 1 make eleven. Let them repeat the name. *Its notation presents a fresh difficulty.* Make a large figure 1 on the B.B., and tell them that stands for 1 bundle, or 10 sticks in 1 bundle. Then make a small 1 beside it to represent the individual stick, thus, 11. Let them copy the symbol on their slates, and tell them that the figures stand for 11. *The name is thus fixed to the symbol.* Vary the instances again, showing 11 cubes, or 11 marbles, etc., and let them name the number in each case. A proper arrangement of the cubes, dots, balls, etc., will greatly assist in the formation of a right conception, thus—



- (b) The same method could be adopted for the teaching of 12, and now the teacher will be able to *illustrate* with a shilling and 12 pennies or with a sixpence and 12 halfpennies. All the numbers up to 19 could be thus treated, the teacher remembering to follow out the various steps in each case as detailed in the lessons given above. For the present the symbols might still be represented with a large figure for the tens, and a small one for the units, thus, 11, 12, 13, 14, 15, and so on. But subsequently the teacher must reduce the tens figure to the same size as the units, and *associate its greater value with its position.* If *coloured chalks* are used in the first case to mark the tens figure, the symbols will be still more intelligible to the children. The teaching of 20 ought to present no difficulty to the teacher now.

Numbers above 20.—The process is practically the same, and there ought to be no further difficulty in dealing with this branch of the subject. As the numbers proceed, the children should be exercised in building up the numbers with the sticks, and afterwards in decomposing them. This will afford capital practice both in *synthesis* and *analysis* of numbers, which is so necessary to the right understanding of some of the after processes in arithmetic. When the children are familiar with the new names for the symbols 30, 40, etc., the connection between them and the numbers between 12 and 20 might be contrasted and explained thus:—

three (3)	and thirteen (13)	and thirty (30).
four (4)	„ fourteen (14)	„ forty (40).
five (5)	„ fifteen (15)	„ fifty (50).

The Notation of Hundreds.—The class already knows up to

99.

1. New Names.—With kindergarten sticks show that *ten tens make 100*. Give the new name, write its symbols on the B.B., let class copy on their slates and repeat the name. In a similar way, let them learn to recognise when written on the B.B. and on their slates 200, 300, etc., up to 900. There will be no difficulty with this step.

2. Decomposition.—Now have the numbers decomposed. The class are already familiar with the process with numbers of two figures, thus :—

100 = 10 tens and no units ; or 1 hundred 0 tens 0 units.

200 = 20 tens and no units ; or 2 hundreds 0 tens 0 units.

3. Notation.—Call attention to the fact that *we simply name what is present*, and say nothing of what is absent. We do not say one hundred no tens and no units, but simply one hundred, or two hundred, etc. Rule three parallel columns on the B.B., and head them units (U), tens (T), and hundreds (H), and see that the class understands them.

4. Further Decomposition.—Give further practice in decomposition—

70 = 7 tens.

300 = 30 tens or 3 hundreds.

111 = 11 tens and 1 unit ; or 1 hundred 1 ten 1 unit.

326 = 32 tens and 6 units ; or 3 hundreds 2 tens 6 units.

Now ask in which column 70 should be placed. Its decomposition helps them to recognise it as 7 tens, and so to place the 7 in the tens column ; 300 would be 3 placed in the hundreds column ; 9 would be placed in the first column, and so on.

5. The Cypher.—Now introduce the cypher. Hitherto we have not needed it in the notation exercises of this stage.

(a) **In the Units.**—Take 420 as an example. Have the number analysed into 4 hundreds and 2 tens. *The absence of units is expressed by a cypher or nought (o).* Compare 10 and 20. The 20 they already know how to write, and the position of the hundreds (4) is now easily fixed for them. Give other examples, as 340, 670, 280.

(b) **In the Tens.**—As in 709. Analyse again into 7 hundreds and 9 units. *The absent tens are expressed by a cypher (o).* Then we write 7 in the hundreds column and 9 in the units. In the middle column (tens) there is a cypher (o) to indicate the absence of tens. Give other examples. Diagrammatic aids may be given by varying the size of the figures according to their place values ; e.g., 249. The chief value of such a system is that it accustoms children to associate increasing values with figures as they proceed to the left. The notation of thousands can be dealt with in the same way. Perhaps it is hardly necessary to remind students that this method of teaching notation teaches numeration at the same time.

NUMBER PICTURES.—The use of number pictures is recommended by the Department in Circular 322 for use in all classes, and a scheme has been elaborated for teaching the numbers up to twenty by means of these number pictures.* There is no doubt about their value educationally, and they constitute one of the best applications of kindergarten yet made. The work is made very attractive and suitable, and the old mechanical faults common to the teaching of this branch of arithmetic are destroyed by it. Children, rightly taught by these tablets, would soon love arithmetic, and would take their first steps under really scientific principles. There is no better method of teaching this stage of the work than by those sheets and tablets.

Requirements.—To make their use effective the author lays down certain requirements.

**Hand and Eye Arithmetic for Infants*, Blackie & Son.

H	T	U
	7	
3		9
1	1	1
3	2	6
4	2	0
7	0	9

1. The number pictures should be bright and attractive.
2. The value of each of the numbers 1 to 10 at least (preferably 1 to 20) should be impressed on the memory by a distinct mental picture.
3. The difference in the value of numbers should at once be apparent to the eye.
4. In each picture number the concrete and the abstract should be combined.
5. The number pictures should allow all the component parts of the number to be vividly shown, both in the concrete and in the abstract, as a result.
 - (a) The truth of the equality of each pair of components with the number itself is self-evident to the eye.
 - (b) The picture of each pair of components is so vividly impressed upon the mind, through the eye, that the mention of one component immediately recalls the other.
6. The number picture should represent pictorially our system of notation.
7. The number pictures should be of such a character that they can be reproduced with ease by the children.
8. The number picture should, if possible, illustrate pictorially the processes of the four simple rules.

Apparatus.

1. **The Vivid Arithmetic Sheets for Number Laying.**—These are for the teacher's use, and are adapted for class teaching. They include four large sheets on rollers, and on them each number from 1 to 20 is represented by a distinct picture in bright attractive colours. It is claimed that the value of each number is impressed on the mind in three ways :—

- (a) By the number of unit squares which compose the concrete representation of the number.
- (b) By the size of the figure itself, each figure being drawn to scale.
- (c) By the space covered.

2. **Vivid Tablets.**—These are supplied to the children, and correspond to the colours on the sheets, which enable them to build an exact representation of each picture number.

3. **Other Apparatus.**—So far as can be gathered from the first few lessons, there would also be required :—

- (a) *Slates* ruled in squares to suit the tablets.
- (b) *Blackboard* ruled to match the slates.
- (c) *Cardboard Figures.* A set of these should be given to each child.
- (d) *Pencils.* Three for each child.
- (e) *Apples.* To teach fractions.

Teaching.—Special stress is laid on the following instructions :—

1. The *model* picture should be made thoroughly secure before attempting to teach the components.
2. The components should first be taught as *pictures*, and when these are thoroughly known, this knowledge should be applied to other concrete objects.
3. Hasten slowly. The knowledge of one number must be thorough and accurate before the next is attempted.
4. The children must *perform* with the tablets the operation required to find the answer.
5. An incorrect answer is never to be passed over. The child should always be required to find the correct answer for itself by means of the sheets or tablets, under the guidance of the teacher.
6. The sheets should be kept constantly in front of the class, and every spare moment should be utilised in questions dealing with some number already taught.

Plan of Lessons.—To teach the numbers from 1 to 20, twenty-three lessons are required, the seventh and thirteenth being recapitulatory lessons; and the first lesson being on counting objects from one to five to familiarise them with the idea of number, and the names they have to use subsequently. The steps in each lesson from the third onwards comprise certain well-arranged steps which are similar, though not always identical, in all the lessons. Let us take the third lesson, on the number 2, as an illustration. The steps involved are:—

- (a) First teach picture 2.
- (b) Then figure 2.
- (c) Then the components.
 - (1) As pictures.
 - (2) Application of the pictures to other objects.
 - (3) Fractions.
- (d) Exercises without squares. Sheets may be used.

To Teach the Number 2.

1. Picture 2.



- (a) The children pick out a brown "*picture-one*" and place "*figure-one*" on it.
- (b) Another brown "*picture-one*" is chosen, and placed by imitation end on to the other.
- (c) It is seen to be larger than *picture-one*, and a new name is given. The children, on invitation, count the two squares. It is then called *picture-two*.
- (d) Brown picture-two is picked out on the sheets.

2. Figure 2.

- (a) The teacher points to *figure-two* on the sheets, and invites the class to find a figure from the cardboard figures like it.
- (b) *Figure-two* is named and placed on *picture-two*.
- (c) The process is repeated with red and blue tablets.
- (d) Children draw *picture-two* on their slates and make *figure-two* on it, the teacher guiding.

3. The Components 1 + 1.

- (a) *As Pictures.* The model picture-two should lie on the desk in front of each child.



1. A red and blue *picture-one* are placed end on end, and the class is invited to name the picture formed—*picture-two*.
2. A question elicits that *picture-one* and *picture-one* make *picture-two*.
3. *Picture-two* is picked out on the sheets.
4. The class is asked how many *picture-ones* make *picture-two*.
5. They are then asked how many times *picture-one* can be taken away from *picture-two*. The answer is given and the operation performed by the children.
6. The children then build with the sheets for other *picture-twos*.
7. They then build from *memory* without the sheets.
- (b) *Application of the Pictures to Other Objects.*—The children must point to the *pictures* corresponding to the number of objects spoken of, as soon as they are mentioned. Thus they—

1. Learn that the *pictures* are of general application.
2. Obtain the required result with absolute certainty.
3. Deepen the mental picture of the components of the number each time they are referred to.

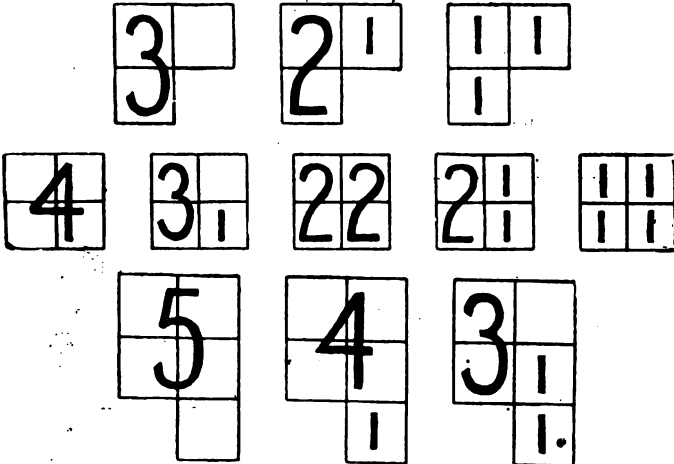
Objects are named and simple operations performed without the tablets, but with the aid of the sheets. They then work from memory again. The exercises should be very simple, and of course limited to 2.

(c) *Fractions. The Half.*

1. An apple is cut in two parts. Each part is called a *half*.
2. Brown *picture-two* is made. *Picture-one* is taken away, and the class is invited to say how much is taken away—*one half*.
3. They are then asked what picture forms a half of *picture-two*—*picture-one*.
4. How many *picture-ones* are there in *picture-two*?—two pictures, etc.
5. How many halves make the whole?—two halves, etc. Remember the answers are always to be in complete sentences.

4. *Exercises without Squares.*—Sheets may be used.

Subsequent Lessons.—These are very like the lesson on the number 2. The only other thing to notice is the representation of the number pictures themselves, and the various ways in which they are shown. It must be remembered that different colours represent the different components, and that as each square is used, the children should say aloud what picture it completes. A few illustrations of the various ways the numbers may be represented are now given.



When the twenty-three lessons have been given, the teacher is advised to gather together all the parts of the different *multiplication tables* which have been taught, arrange them in order in

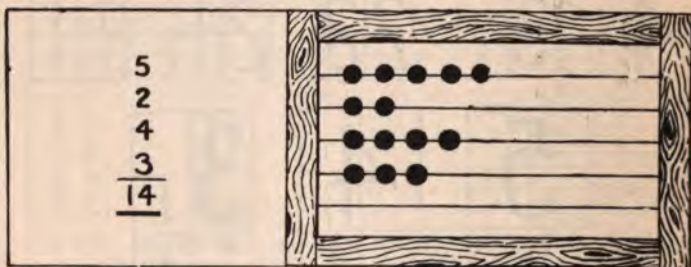
the usual form, and then carefully commit them to memory. The meaning of the tables will have been made so clear during the lessons that it is asserted the children will have little difficulty in learning the remaining parts after constructing them for them-



selves, and applying them intelligently in the solving of little problems. It is also claimed that all the principles involved in dealing with numbers up to 100 have been taught.

SIMPLE ADDITION.

I. Units.—To teach simple addition of units, any of the material objects used in the lessons on notation may be utilised. If the teaching in those lessons has been successful, the children ought already to be able to add units up to 100. The teacher's work will then be limited to the method adopted of setting out the work, and to making this intelligible to the children. Where neither picture numbers nor kindergarten sticks nor equivalent aids have been used, the teacher might use the ball frame and the B.B.



1. Dictate the number 5, count 5 beads on the ball frame, and write the figure 5 upon the B.B. Proceed in the same way with the other numbers.
2. In each case the counting is to be done first in the concrete with the beads, then in the abstract with the figures on the B.B.
3. The work is to be done step-wise, thus :—

100
101
102
103
104
105
106
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198
199
200

- 3 beads and 4 beads make 7 beads. \therefore 3 and 4 make 7.
 7 beads and 2 beads make 9 beads. \therefore 7 and 2 make 9.
 9 beads and 5 beads make 14 beads. \therefore 9 and 5 make 14.
4. The teacher then draws a line beneath the 3 and writes down the 14. The class might then go through the same process, beginning with the top figure. The children will see that the same answer is obtained.
5. The work might then be varied with kindergarten cubes, thus :—



and



make



and



make



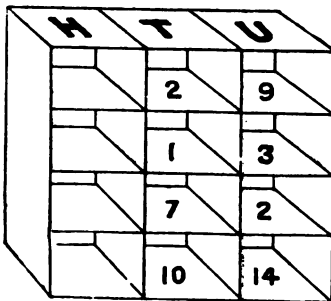
& so on.

The advantage of the cubes is that the *growth* of the addition is made clear step by step. As in the previous case the B.B. should be used. By thus varying the objects, the *certainty* and *accuracy* of the truths involved are impressed upon the child, who thus learns that whatever the object used may be, 4 and 3 always make 7. The transition to the abstract is also rendered easier.

6. All the concrete objects should now be removed, and the work done mentally. Other examples should follow to give the necessary practice for accuracy.

II. Tens.—The preparatory lessons on notation, or the use of picture numbers and the arithmetic problems involved, ought still to be sufficient to make this next step fairly easy to the children. “*Carrying*” is an added difficulty in this case. The numerical box and the B.B. might be used for this lesson.

1. Show the box and explain the use of its compartments. Let the class thoroughly understand that all the units will be placed in the compartments under the U, and all the tens in the compartments labelled T. The hundreds can be left till the next lesson.
2. Practise the class in the decomposition of numbers on the B.B. Thus :—
 29 is equal to 20 and 9, *i.e.*, to 2 tens and 9 units.
 13 is equal to 10 and 3, *i.e.*, to 1 ten and 3 units.
 72 is equal to 70 and 2, *i.e.*, to 7 tens and 2 units.



10 tens make 100. Hence we have 100 and 14, which is written

114.

3. Set the above sum on the B.B., and decompose the first number 29 as shown. The class will readily understand you then when you place 2 sticks under the tens (T), and 9 sticks under the units (U). Proceed with the other numbers in the same way. The bottom compartments can be used as answer compartments.

4. Commence with the units compartments. Take the 9 sticks out of the top compartment and place them in the next below. Let the class count all the sticks in it—12. Then 9 sticks and 3 sticks make 12 sticks. Next take the 12 sticks out and place them in the next below, and again let class count all the sticks within that compartment—14. Then 12 sticks and 2 sticks make 14 sticks.
5. Then turn to the B.B., and let the work be done there in the abstract, thus: 9 and 3 are 12, 12 and 2 are 14.
6. Proceed in the same way with the tens compartments.
7. Then explain as shown under the diagram, and the total is found to be 114.
8. Now turn to the B.B. Cast the units column upwards, beginning with the 2. The total is 14 again. Decompose this into 1 ten and 4 units. Tell the class to place the 4 units under the units column, and then add the 1 ten to the tens column; thus $1 + 7 + 1 + 2 = 11$. Tell them to write down the 11 beside the 4, and they will perceive that the answer is again 114. The reason for so doing ought now to be well understood by the class.
9. As a confirmatory step compare the two methods of expressing the number 114, and let the class see that they both produce the same result.

T	U
2	9
1	3
7	2
11	4

Thus 10 tens and 14 units = 100 and 14 = 114.

11 tens and 4 units = 110 and 4 = 114.

10. Further exercises should be dealt with in the same way, the sticks and the box being eventually withdrawn, and the whole work done in the abstract with the figures only. "Hundreds" can be taught in the same way.

SIMPLE SUBTRACTION.

I. First Lessons.—It is assumed that the children can perform easy examples in subtraction from the practice already received with the kindergarten sticks, picture numbers, cubes, beads, and ball frame. It is also assumed that they are familiar with the method of representing these simple exercises on the B.B. and on their slates, for both were used through these earlier lessons. The teacher's work should then commence where the last lessons finished.

Preparatory Exercises.—These should involve neither borrowing nor decomposing. In every case the figures in the bottom line should be less than those above it in the top line. The children ought to be able to do these exercises mentally. Thus:—

18	27	35	19	17	12	78	91
13	16	21	8	4	10	53	60
—	—	—	—	—	—	—	—
5	11	14	11	13	2	25	31
—	—	—	—	—	—	—	—

II. The Method of Decomposition.

—Take 17 from 45.

- (a) Use the ball frame or kindergarten sticks. Show that—

$$\begin{array}{lcl}
 45 = 4 \text{ tens and } 5 \text{ units} & = 40 + 5 & = 45 \\
 = 3 \text{ tens and } 15 \text{ units} & = 30 + 15 & = 45 \\
 17 = 1 \text{ ten and } 7 \text{ units} & = 10 + 7 & = 17
 \end{array}$$

$$\text{Difference} = 2 \text{ tens and } 8 \text{ units} = 20 + 8 = 28$$

- (b) Now work the process on the B.B.; e.g., take 344 from 721. *Decomposing* each number, we have—

$$\begin{array}{l} 721 = 7 \text{ hundreds and } 2 \text{ tens and } 1 \text{ unit} = 700 + 20 + 1 = 721 \\ \quad = 6 \text{ hundreds and } 12 \text{ tens and } 1 \text{ unit} = 600 + 120 + 1 = 721 \\ \quad = 6 \text{ hundreds and } 11 \text{ tens and } 11 \text{ units} = 600 + 110 + 11 = 721 \\ 344 = 3 \text{ hundreds and } 4 \text{ tens and } 4 \text{ units} = 300 + 40 + 4 = 344 \end{array}$$

$$\text{Difference} = 3 \text{ hundreds and } 7 \text{ tens and } 7 \text{ units} = 300 + 70 + 7 = 377$$

- (c) Work other examples on the B.B., supplementing, illustrating, explaining, and correcting where necessary. Let class then work exercises on their slates.

III. The Method of Equal Additions.

1. Preparatory Exercises.—The object of these will be to reveal to the class the fundamental axiom on which this method is based. Use the ball frame or kindergarten sticks, and proceed as follows:—

$$\begin{array}{l} 9 - 4 = 5. \\ (9 + 3) - (4 + 3) = 12 - 7 = 5 \\ (9 + 6) - (4 + 6) = 15 - 10 = 5 \\ (9 + 8) - (4 + 8) = 17 - 12 = 5 \end{array}$$

From these and similar examples the class will infer that if the **same quantity be added to two unequal numbers their difference will remain unaltered.**

2. Application of this Truth to Other Examples.—Ask for the difference between 17 and 45—28 by the last method. *But the answer will remain unaltered if I add the same number to both of these quantities, e.g.:*—

$$\begin{array}{l} 45 + 10 = 4 \text{ tens and } 15 \text{ units} = 40 + 15 = 55 \\ 17 + 10 = 2 \text{ tens and } 7 \text{ units} = 20 + 7 = 27 \end{array}$$

$$\text{Difference} = 2 \text{ tens and } 8 \text{ units} = 20 + 8 = 28$$

The children may experience some difficulty in grasping the reason of this, the special point of difficulty being that the additions, although equal, are made to the units in the one case and to the tens in the other. Explain that this is merely a matter of convenience to make the work easier, and illustrate as follows:—

- (a) Original numbers 45 } The children are to note that the 7 cannot
17 } be taken from the 5.

- (b) Add 10 to each quantity—
45 + 10 = 55 } Children still to note that the 7 cannot be taken
17 + 10 = 27 } from the 5.

- (c) Now decompose the numbers. Children to note that the 7 now *can* be taken from 15.

$$\begin{array}{l} 55 = 4 \text{ tens and } 15 \text{ units.} \\ 27 = 2 \text{ tens and } 7 \text{ units.} \end{array}$$

3. Exercises.—Now let exercises be worked on the B.B., and extend the process to 3 figures; e.g., take 354 from 543.

$$\begin{array}{l} 543 = 5 \text{ hundreds } 14 \text{ tens (10 tens added) } 13 \text{ units (10 added)} = 653 \\ 354 = 4 \text{ hundreds (100 added) } 6 \text{ tens (1 ten added) } 4 \text{ units} = 464 \end{array}$$

$$\text{Difference} = 1 \text{ hundred } 8 \text{ tens } 9 \text{ units} = 189$$

The class should now be invited to test the additions. There has been added—

$$\text{To the top line} \quad - \quad 10 \text{ tens and } 10 \text{ units} = 100 + 10 = 110$$

$$\text{To the bottom line} \quad - \quad 1 \text{ hundred and } 1 \text{ ten} = 100 + 10 = 110$$

i.e., Equal Additions are made in each case.

IV. The Method of Complementary Addition.—This method is much the same as what is known as “proving” subtraction, and it is claimed for it that it is easy and does away with one of the simple rules (subtraction), reducing the simple rules to three instead of four; *i.e.*, to addition, multiplication, and division. The practice which the children have already received in the analysis and synthesis of numbers, in decomposing them and in building them up, will assist materially in making these complementary additions. There are two difficulties to which the teacher will require to call attention:—

- (a) The case when borrowing is required in ordinary subtraction.
 (b) The case of cyphers.

1. Easy Examples.—First give some preparatory exercises:—

$7 + 9 = 16$. Here the complement of 9 is 7, and the complement of 7 is 9, because $9 + 7 = 16$ and $7 + 9 = 16$. Other and similar examples might be given.

Examples should then be set which are easy for the same reason that they are easy in either of the other methods, *viz.*, that each figure in the top line is greater than the figure placed beneath it.

$$\begin{array}{r} 68429 \\ 17213 \\ \hline 51216 \end{array} \left. \begin{array}{l} 3 + (6) = 9; 1 + (1) = 2; 2 + 2 = 4; 7 + 1 = 8; 1 + 5 = 6. \end{array} \right\}$$

2. Harder Examples.—This includes cases where any bottom figure is greater than any top figure placed above it. If the children are to understand the reason of the process they employ, the method becomes by no means so easy as is asserted. An analysis of the example given will show that some of the difficulties of both the other methods are involved. Still there is no doubt that the method is easy and quick in practice.

$$\begin{array}{r} 2632 \\ 1756 \\ \hline 876 \end{array} \left. \begin{array}{l} \end{array} \right\}$$

units $6 + (6) = 12 = 2 \text{ units} + 1 \text{ ten}.$
 tens $5 + (7) + (1) = 13 = 3 \text{ tens} + 1 \text{ hundred}.$
 hundreds $7 + (8) + (1) = 16 = 6 \text{ hundred} + 1 \text{ thousand}.$
 thousands $1 + (0) + (1) = 2.$

3. The Cypher.—An examination of an example will show that the cypher must always be looked upon as 10, *e.g.*,:—

$$\begin{array}{r} 3009 \\ 1537 \\ \hline 1472 \end{array} \left. \begin{array}{l} 7 + (2) = 9; 3 + (7) = 10 = 0 \text{ tens and } 1 \text{ hundred}. \\ 5 + (4) + (1) = 10 = 0 \text{ hundreds and } 1 \text{ thousand}. \\ 1 + (1) + (1) = 3. \end{array} \right\}$$

It will be observed that the complementary figure, and the figure to be carried, is expressed in brackets in these explanations. If such a method were adopted, it would probably be better expressed as follows:—

$\begin{array}{r} 68429 \\ 17213 \\ \hline 51216 \end{array}$	$\begin{array}{r} 2632 \\ 1756 \\ \hline 876 \end{array}$	$\begin{array}{r} 3009 \\ 1537 \\ \hline 1472 \end{array}$
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TWO METHODS COMPARED.

Decomposition.	Equal Additions.
<ol style="list-style-type: none"> 1. It applies and extends the power of decomposing numbers already acquired by children. 2. By many the method is alleged to be simpler, and the reason of the process is more readily grasped because no new principle is involved. 3. It is not so largely used as the other method. 4. By many teachers it is not considered so safe as the method of equal additions. 5. Though easier in principle, it is harder in practice, through the mental process of decomposition involved. 6. It is the slower method for work probably. 7. The occurrence of cyphers increases the difficulty of the work. 	<ol style="list-style-type: none"> 1. It introduces and applies one of the fundamental axioms of mathematics—that if the same quantity be added to two numbers their difference remains unaltered. 2. It is more difficult of comprehension because the equal additions are made to different denominations. Some teachers hold a conflicting opinion to this. 3. It is the general method in practice. 4. Many consider it the safer method, because there is no difference in the process, although there may be in the examples. 5. Though more difficult of apprehension it is easier in practice, involving only a minimum effort to "borrow" and "pay back." 6. It is the quicker method for work. 7. The occurrence of cyphers does not increase its difficulty.

THE MULTIPLICATION TABLES.

I. Memory.—The period from the sixth to the tenth years is the best time for memory work, and it is called the **plastic period** of the mind. **Repetition** is necessary for permanence of impression, and the art of teaching the multiplication tables is to lessen the number of repetitions for their retention. The work is exhausting, hence there should be suitable rests and sequences.

The time for memory work is important. **Early morning** is favourable, because the total energy of the pupils is then at its greatest. **The last hour of morning school** is suitable, because the strength of the pupils is then at its best. **Cold weather** is conducive to vigorous mental work, because the vigour of the body is always greater at these periods.

Some natures require prompting or stimulating, hence it may be necessary to subject some pupils to some form of pain, but the association is an unfortunate one, and should be avoided if possible. With the great majority it will always be sufficient to present the work in such a form as will arouse the greatest amount of interest.

The formation of memory depends upon the **formation of good habits** of acquisition, *e.g.*, comparison, contrast, and classification through the detection of similarity and difference. The method of **questioning** adopted by the teacher may also be made to aid memory very much.

II. Teaching.—The tables may be grouped into two classes : those which are easy, and those which are more difficult of acquisition.

1. Easy Tables.—These include the tables for two, three, four, five, ten, and eleven.

- (a) **Two Times and Three Times.**—Let the children make up these tables for themselves. Thus $2 \times 3 = 6$ can be verified by the child, who can count 3 twice or 2 thrice, and so find the total; and so with the other numbers. If the picture numbers have been used, many of the easier products will be already known. The leaps here between product and product are very small, and the mind is generally agile enough to make them. They also enter more largely into the conversation of the children in their everyday life; e.g. : "I'm twice as big as you;" "He has three times as many marbles as John".
- (b) **Four Times.**—This is easy for the same reasons, though increasing in difficulty over 2 and 3.
- (c) **Five Times.**—This is very easy from the alternate recurrence of the 5 and the 0.
- (d) **Ten Times.**—This table also is very easy from the invariable recurrence of the 0, and from the similarity of figures in the product and the multiplicand, e.g. :—

$$\begin{array}{l} 10 \times 8 = 80 \\ 10 \times 5 = 50 \\ 10 \times 11 = 110 \end{array} \left. \vphantom{\begin{array}{l} 10 \times 8 = 80 \\ 10 \times 5 = 50 \\ 10 \times 11 = 110 \end{array}} \right\} \text{The attention should be called to all these mnemonics.}$$

- (e) **Eleven Times.**—This is easy until the century is passed, from the reduplication of the figures in the product each time. e.g. :—

$$\begin{array}{l} 11 \text{ times } 3 \text{ are } 33. \\ 11 \quad \quad 4 \quad \quad 44. \\ 11 \quad \quad 5 \quad \quad 55; \text{ etc.} \end{array}$$

After the century they are harder because this reduplication disappears. The teacher may use devices for fixing, but as there are but three items to learn, a little vigorous repetition would soon fix these. In learning tables a certain amount of rote work is absolutely necessary, and must be faced.

2. Hard Tables.—These include the tables for six, seven, eight, nine, and twelve.

- (a) **Six Times.**—Seven-twelfths of this table are already known, e.g. :—

$$\begin{array}{lll} 6 \times 1 = 6 & \text{and is the same as} & 1 \times 6 = 6. \\ 6 \times 2 = 12 & \text{'' '' ''} & 2 \times 6 = 12. \\ 6 \times 3 = 18 & \text{'' '' ''} & 3 \times 6 = 18. \\ 6 \times 4 = 24 & \text{'' '' ''} & 4 \times 6 = 24. \\ 6 \times 5 = 30 & \text{'' '' ''} & 5 \times 6 = 30. \\ 6 \times 10 = 60 & \text{'' '' ''} & 10 \times 6 = 60. \\ 6 \times 11 = 66 & \text{'' '' ''} & 11 \times 6 = 66. \end{array}$$

Now divide the remaining products into two classes :—

$$\begin{array}{ll} (1) & 6 \times 6 = 36. \\ & 6 \times 8 = 48. \\ & 6 \times 12 = 72. \end{array} \quad \begin{array}{ll} (2) & 6 \times 7 = 42. \\ & 6 \times 9 = 54. \end{array}$$

In the first class, point to the typed *coincidences*, and give plenty of repetition to both. It may also be advisable to *decompose* the second class, and to show that 6 groups of 7 = 7 groups of 6, and to let the class count the product in each case, thus—

- (b) Take an easy example; e.g., 4352×4 . Decompose the multiplicand, and set out thus:—

$$\begin{array}{r} (1) \quad 4000 \times 4 = 16000 \\ 300 \times 4 = 1200 \\ 50 \times 4 = 200 \\ 2 \times 4 = 8 \end{array}$$

$$\begin{array}{r} (2) \quad 4000 + 300 + 50 + 2 \\ \hline 4 \\ \hline 16000 + 1200 + 200 + 8 \end{array}$$

$$4352 \times 4 = 17408$$

- (c) Then set out the sum on the B.B. in the ordinary form, and explain the "carrying," which the class will now be able to understand. To make the transition easier, and quite intelligible, one extra step might be introduced thus:—

T	H	T	U	
4	3	5	2	
			4	
16 thous.	12 hun. or	20 tens or	8 units.	
16 thous.	1 T + 2 H	2 H	8 units.	
			8 units.	
17 thous.	4 hund.	0 tens		

Final Form.

$$\begin{array}{r} 4352 \\ 4 \\ \hline 17408 \end{array}$$

Multiplication by Two Figures.

The class can multiply by one figure, and the same method enables them to multiply by numbers up to 12; hence they can multiply by 10. Take as an example 4872×67 .

1. Analyse the multiplier into $60 + 7$. We require 60 times 4872 and 7 times 4872, and if we add the two answers together we shall have 67 times 4872.
2. Exercise with multipliers having a cypher in the units; e.g., 20, 30, 40, etc. The class already know how to multiply by 10, and an analysis of the product will show that with all such multipliers we multiply by the tens figure and add a cypher to our answer. The reason is that $20 = 2 \times 10$, and so on.
3. Set the work on the B.B. as follows:—

$$4872 \times 7 = 34104$$

$$4872 \times 60 = 292320$$

$$4872 \times 67 = 326424$$

4. Then set the work out in the ordinary form, and show that the bracketed cypher may be omitted without altering the value.

$\begin{array}{r} 4872 \\ 67 \\ \hline 34104 \\ 29232(0) \\ \hline 326424 \end{array}$	<p>Final Form.</p> $\begin{array}{r} 4872 \\ 67 \\ \hline 34104 \\ 29232 \\ \hline 326424 \end{array}$
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Multiplication by Three Figures.

1. Some preparatory work will be required to explain and accustom the class to two cyphers in the multiplier in such quantities as 200, 300,

400, etc. The class will soon understand why they add two cyphers in the answer. They can already multiply intelligently by such quantities as 20, 30, 40, etc. And decomposition will readily show that $200 = 20 \times 10$; $300 = 30 \times 10$; and in each case both these factors are within the multiplying capacity of the class. Some exercises should be given to test the soundness of their knowledge of this process; e.g., 6429×200 ; 7835×400 , etc.

2. Take as an example 6843×234 .
3. Decompose the multiplier into $200 + 30 + 4$.
4. Proceed as follows:—

$$6843 \times 200 = 1368600$$

$$6843 \times 30 = 195290$$

$$6843 \times 4 = 27372$$

$$6843 \times 234 = 1591262$$

5. Combine the three into the ordinary form, putting the value of each product by its side, and again explaining and demonstrating that the bracketed cyphers may be omitted without altering the value of the answer.

Final Form.

$\begin{array}{r} 6843 \\ 234 \\ \hline 27372 \\ 19529(0) \\ 13686(0)(0) \\ \hline 1591262 \end{array}$	$= 4 \times 6843$ $= 30 \times 6843$ $= 200 \times 6843$ $= 234 \times 6843$	$\begin{array}{r} 6843 \\ 234 \\ \hline 27372 \\ 19529 \\ 13686 \\ \hline 1591262 \end{array}$
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Multiplication by Factors.—Multiplication by factors is useful as introducing a little variety into the work, and in the case of the products of two factors there may be some economy in time; but there is rarely any advantage practically in dealing with factors beyond this limit. There is the advantage of the extra training in the analysis of numbers, but there is rarely any economy in dealing with such a quantity as 216 by factors, unless the pupil is very ready at such analysis. Whilst he is searching out the factors $6 \times 4 \times 9$, he would already have partly made his calculation by the ordinary method. There is no difficulty in demonstrating this method intelligently to the class. The multiplier is factored, and the value of each product is written against it. Take as examples 3456×28 and 7891×216 .

Factor the multipliers $7 \times 4 = 28$; $9 \times 4 \times 6 = 216$.

$\begin{array}{r} 3456 \\ 7 \\ \hline 24192 \\ 4 \\ \hline 96768 \end{array}$	$= 7 \times 3456$ $= 28 (4 \times 7) \times 3456$	$\begin{array}{r} 7891 \\ 9 \\ \hline 71019 \\ 4 \\ \hline 284076 \\ 6 \\ \hline 1704456 \end{array}$
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$$1704456 = 216 (6 \times 4 \times 9) \times 7891$$

Short Methods.

1. With such numbers as 101, 201, 301, etc., it will be noticed that the units are unity and there are no tens.

Take 68754×201 as an example.
 Put down the first two figures (54), and multiply the first figure (4) by 2, adding in the third figure back (7), and so on.

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This example should be set out on the B.B., and worked by the ordinary method, and the two compared. The reason for the process will then be obvious.

2. With such numbers as 1110 or 1114, it will be noticed that each digit is unity except the first.

Take as examples 56173×1110 and 56173×1114 .

- (a) $\begin{array}{r} 56173 \\ 1110 \\ \hline 62352030 \end{array}$ Put down a cypher for the units in the first example. In the second multiply by 4, and then in each case add in at each multiplication as many back figures as there are "ones" in the multiplier; e.g., the carried figure is in brackets.

- (b) $\begin{array}{r} (000)56173 \\ 1114 \\ \hline 62576722 \end{array}$ (a) 0; 3; 3 + 7 = 10 (0 and carry 1); 3 + 7 + 1 + (1) = 12 (2 and carry 1); 7 + 1 + 6 + (1) = 15 (5 and carry 1); 1 + 6 + 5 + (1) = 13 (3 and carry 1); 6 + 5 + (1) = 12 (2 and carry 1); 5 + (1) = 6.

- (b) The second case is a little more difficult, and it will save errors if the student imagines there to be as many cyphers prefixed to the multiplicand as there are ones in the multiplier.

$$\begin{array}{lcl} (4 \times 3) & = (1)2 & | (4 \times 5) + (3) + 6 + 1 + 7 = (3)7 \\ (4 \times 7) + (1) + 3 & = (3)2 & | (4 \times 0) + (3) + 5 + 6 + 1 = (1)5 \\ (4 \times 1) + (3) + 7 + 3 & = (1)7 & | (4 \times 0) + (1) + 0 + 5 + 6 = (1)2 \\ (4 \times 6) + (1) + 1 + 7 + 3 & = (3)6 & | (4 \times 0) + (1) + 0 + 0 + 5 = 6 \end{array}$$

3. With multipliers composed wholly or mostly of nines, e.g., 9, 999, 96, 993, etc., it will be noted that the numbers are always near some multiple of 10. The method is an application of the mathematical truth that **if the same quantity be added and subtracted from a number you do not alter its value.** Take as examples 3475×9 ; 999 ; 96 . Deal with the multipliers thus:—

$$\begin{array}{lcl} 9 = 10 - 1; 999 = 1000 - 1; 96 = 100 - 4. \\ 34750 = 10 \text{ times } 3475 & 3475000 = 1000 \text{ times } 3475 \\ 3475 = 1 \text{ ,, } 3475 & 3475 = 1 \text{ ,, } \text{ ,, } \\ \hline 31275 = 9 \text{ ,, } 3475 & 3471525 = 999 \text{ ,, } \text{ ,, } \\ & 347500 = 100 \text{ times } 3475 \\ & 13900 = 4 \text{ ,, } \text{ ,, } \\ \hline & 333600 = 96 \text{ ,, } \text{ ,, } \end{array}$$

4. With multipliers composed of multiples of 5.

$$\begin{array}{lcl} 25. \text{ Add two cyphers and divide by 4 for } \frac{100}{4} = 25. \\ 125. \text{ ,, three ,, ,, } \frac{1000}{8} = 125. \\ 625. \text{ ,, four ,, ,, } \frac{10000}{16} = 625. \end{array}$$

Obviously such examples as these must be left until division is learned. Some may have to be postponed until fractions and decimals are known, e.g.:—

12½.	Add two cyphers and divide by 8 for 2½ = 180 = 12½
16½.	" " " 6 " 48 = 180 = 16½
11½.	" " " 9 " 11½ = 180 = 11½
900.	" " " 11 " 900 = 1800 = 1100

SHORT DIVISION.—The preparatory exercises introducing Short Division will have been thoroughly mastered during the earlier lessons on addition, notation, etc., with the kindergarten sticks or picture numbers, or other concrete aids. Each term as it is introduced should be explained.

I Its Connection with Multiplication.—The process is the inverse of multiplication, and depends on the recollection of what has been learned in multiplication.

<i>Multiplication.</i>	<i>Division.</i>
$2 \times 8 = 16$	$16 \div 2 = 8$
$3 \times 4 = 12$	$12 \div 3 = 4$
$7 \times 6 = 42$	$42 \div 7 = 6$

Let the class examine and compare these on the B.B. Lead them to see that there are—

8 groups of 2 in 16 or 2 groups of 8 in 16.
4 " 3 in 12 or 3 " 4 in 12.
6 " 7 in 42 or 7 " 6 in 42.

II Methods of Expression.—Give these next, both symbolic and verbal.

Verbal Methods.

- (a) Divide 16 by 2.
- (b) How many 2's are there in 16?
- (c) Divide 2 into 16.

All these calculations can be made with concrete objects first and then mentally. Other examples should be given.

III Its Connection with Subtraction.—The teacher should now connect division with subtraction, by showing that it is a shortened form of subtraction. Thus, on the ball frame show that—

$15 \div 5 = 3$, or there are 3 groups of 5 in 15.
 $15 - 5 - 5 - 5 = 0$; i.e., 3 groups of 5 have been subtracted from 15 and nothing is left, hence 15 is composed of three fives, or 5 into 15 goes 3. Show this step by step.

$15 - 5 = 10$; first position; 5 taken away and 10 left.
 $10 - 5 = 5$; second position; 5 taken away and 5 left.
 $5 - 5 = 0$; third position; another 5 is taken away and 0 left.

Similar examples should then be worked mentally.

IV. Short Division with a Remainder.—Demonstrate with concrete objects.

Division.

$$11 \div 2 = 5 + 1$$

$$\text{or } 2)11$$

$$\underline{\quad\quad\quad}$$

$$5 + 1$$

i.e., there are 5 groups of 2 in 11 and 1 unit is left.

Subtraction.

$$11 - 2 = 9$$

$$9 - 2 = 7$$

$$7 - 2 = 5$$

$$5 - 2 = 3$$

$$3 - 2 = 1$$

The number of groups of 2 is 5 and the remainder is 1.

Give other examples for practice, still working first in the concrete and then in the abstract, *e.g.* :—

$$19 \div 3 = 6 + 1$$

$$23 \div 4 = 5 + 3$$

$$45 \div 6 = 7 + 3$$

$$14 \div 4 = 3 + 2$$

Call attention to the remainder in each case. *It is always less than the divisor.* The class will now see clearly that the divisor is not always contained an even number of times in the dividend.

By this stage the class should have discovered that a number may be divided up into equal groups exactly, or into equal groups with some quantity less than one of the groups remaining over. *The process of finding these groups is called division.* The quantity contained in one group is called the **divisor**. The number to be divided into groups is called the **dividend**. The number of groups into which it is divided is called the **quotient**. What is left over (if any) is called the **remainder**.

V. Harder Examples.—Take as an example $5729 \div 7$.

Decompose the dividend 5729 so far as possible into multiples of 7; *i.e.*, into quantities containing an equal number of 7's without a remainder, thus :—

$$5729 = 5600 + 70 + 59 \text{ then}$$

$$7)5600 + 70 + 59$$

$$\underline{\quad\quad\quad}$$

$$800 + 10 + 8 \text{ and } 3 \text{ over.}$$

Which is expressed shortly thus :—

$$7)5729$$

$$\underline{\quad\quad\quad}$$

$$818 + 3$$

The children will now be prepared to receive the *rule* as generally given, and to understand the processes which that rule embodies.

VI. Division by Factors.—Take as an example $349 \div 42$.

Decompose both divisor and dividend.

$$42 = 6 \times 7; \text{ and } 349 = 300 + 48 + 1$$

$$\text{Then we have } 6)300 + 48 + 1$$

$$\underline{\quad\quad\quad}$$

$$50 + 8 \text{ and } 1 \text{ remainder.}$$

$$\text{i.e., } 6)349$$

$$\underline{\quad\quad\quad}$$

$$58 + 1 \text{ i.e., } 58 \text{ groups of } 6 \text{ and } 1 \text{ unit as remainder.}$$

$$\text{Now decompose } 58 \text{ into } 56 + 2$$

$$\text{Then } 7)56 + 2$$

$$\underline{\quad\quad\quad}$$

$$8 \text{ and } 2 \text{ remainder. i.e., } 7)58$$

$$\underline{\quad\quad\quad}$$

$$8 + 2$$

The whole process is then shown as—

$$\begin{array}{r}
 42 \quad \left\{ \begin{array}{l} 6 \overline{)349} \\ 7 \overline{)58 + 1} = 58 \text{ groups of } 6 \text{ and } 1 \text{ unit left.} \end{array} \right. \\
 \hline
 8 + 2 = 8 \text{ groups of } 42 \text{ and } 2 \text{ sixes left.}
 \end{array}$$

For total remainder we have—

$$\begin{array}{r}
 2 \text{ groups of } 6 = 12 \\
 \text{and } 1 \text{ unit} = 1 \\
 \hline
 \therefore \text{Total remainder} = 13 \\
 \text{Which is found thus } 2 \times 6 + 1 \\
 \text{Answer } 8 + 13 \text{ over.}
 \end{array}$$

Rule.—Factor the divisor, and divide the dividend by the first factor; then divide its quotient by the next factor. Finally multiply the last remainder and the first divisor, and add in the other remainder (if any), and this will give the correct remainder.

Divisibility of Numbers.—A number is divisible by—

1. **Two**, if its units digit is measured by 2. The reason is obvious.
2. **Three**, if the sum of its digits is measured by 3. This will be explained under the divisibility for 9, as 3 is a factor of 9, and a number divisible by 9 is thus divisible by 3.
3. **Four**, if the units and tens divide by 4, for 100 is divisible by 4.
4. **Five**, if the units digit is 5 or 0, for all products of 5 end in 5 or 0.
5. **Six**, if the number is divisible by 2 and 3, for $2 \times 3 = 6$.
6. **Seven**, a test of divisibility is known for 7, but it is best done by trial.
7. **Eight**, if the number expressed by its 3 lowest digits is measured by 8, for 1000 is divisible by 8.
8. **Nine**, if the sum of its digits is measured by 9. Take 57978 as an example. Decompose 57978 into $50000 + 7000 + 900 + 70 + 8$.

$$\begin{array}{r}
 \text{Now } 50000 = 9 \times 5555 + 5 \\
 \text{and } 7000 = 9 \times 777 + 7 \\
 \text{and } 900 = 9 \times 99 + 9 \\
 \text{and } 70 = 9 \times 7 + 7 \\
 \text{and } 8 = \quad \quad + 8
 \end{array}
 \left. \vphantom{\begin{array}{l} 50000 \\ 7000 \\ 900 \\ 70 \\ 8 \end{array}} \right\} \begin{array}{l} \text{It will be observed that the} \\ \text{quantity is made up of} \\ \text{factors of } 9 + \text{remainders} \\ \text{which are the same as the} \\ \text{digits in the number.} \end{array}$$

9. **Ten**, if the number has a cypher in the units. The reason is obvious.
10. **Eleven**, if the difference between the sums of the digits in alternate places is 0, or is measured by 11. For any number as 6743 is composed of—

$$\begin{array}{r}
 3 = \quad \quad \quad + 3 \\
 40 = 4 \times \quad \times 11 - 4 \\
 700 = 7 \times \quad 9 \times 11 + 7 \\
 6000 = 6 \times 91 \times 11 - 6
 \end{array}
 \left. \vphantom{\begin{array}{l} 3 \\ 40 \\ 700 \\ 6000 \end{array}} \right\} \begin{array}{l} \text{It will be observed that the number} \\ \text{is composed of factors of } 11 + \\ \text{or } - \text{ remainders which are the} \\ \text{same as the digits of the number.} \\ \text{It will also be noticed that the} \\ \text{signs run alternately.} \end{array}$$

Take another example: 20603.

$$\begin{array}{r}
 \text{Sum of the odd places} = 3 + 6 + 2 = 11. \\
 \text{,, ,, even places} = 0 + 0 = 0.
 \end{array}$$

Divide each by 11 and you get the same remainder (0). Hence a number divided by 11 when the sum of the odd figures and the sum of the even figures each divided by 11 leaves the same remainder.

Short Methods.—Where practicable, the teacher should teach such short methods as the following:—

1. **To divide by 625.** Multiply by 16 in 1 line, and mark of 4 places.

$$\text{For } \frac{625 \times 16}{1000} = 625.$$

2. **To divide by 625.** Multiply by 16 and mark off 1 place.

$$\text{For } \frac{625}{1000} \times \frac{16}{10} = .625.$$

LONG DIVISION.—Work an easy example by both methods, and let the class thus discover the reason why the process is called long. They will readily observe that there is less work done mentally by this method, hence its name.

Take as an example $6863 \div 9$.

$$\begin{array}{r} \text{Short Division.} \\ 9 \overline{)6300 + 540 + 18 + 5} \\ \hline 700 + 60 + 2 \text{ and } 5 \text{ over.} \end{array}$$

Which is written thus:—

$$\begin{array}{r} 9 \overline{)6863} \\ \hline 762 + 5 \end{array}$$

$$\begin{array}{r} \text{Long Division.} \\ 9 \overline{)6863(700 + 60 + 2} \\ 6300 = 9 \times 700 \end{array}$$

$$\begin{array}{r} 563 \text{ subtracting} \\ 540 = 9 \times 60 \end{array}$$

$$\begin{array}{r} 23 \text{ subtracting} \\ 18 = 9 \times 2 \end{array}$$

5 subtracting

Which is written thus:

$$\begin{array}{r} 9 \overline{)6863(762} \\ 63 \\ \hline 56 \\ 54 \\ \hline 23 \\ 18 \\ \hline 5 \end{array}$$

The class will see that the decomposition is the same in each case, and that *the principle ruling the decomposition is to get numbers which are multiples of the divisor*, and that this is done in each case except the last. The rule could then be given, and other examples worked, gradually increasing in difficulty. The decomposition should be pointed out in each case. It will always be found to be the substratend. The work should then be set out in the ordinary way.

If there is any lack of comprehension, the process might be further illustrated as follows:—

$$\begin{array}{r} 6863 \\ \hline = 700 + 563 \text{ remainder} \\ 9 \\ \hline 563 \\ \hline = 60 + 23 \text{ remainder} \\ 9 \\ \hline 23 \\ \hline = 2 + 5 \text{ remainder} \\ 9 \end{array}$$

- There are two points to notice.
- (1) Each remainder becomes a new dividend until the last is too small; *i.e.*, until the remainder is less than the divisor.
 - (2) That the answer is composed of the sum of the quotients + the last remainder.

COMPOUND RULES.

Meaning of Term.—By this phrase we understand calculations made in money and the various weights and measures. In the simple rules we have to deal with quantities formed on *one*

regular denomination with a fixed relative value, which is regular and dependent on the position of the digits expressing those numbers. Thus in the number 111, *each* figure to the left is ten times the value of the figure to its right. It can be expressed thus:—

$$\begin{aligned} 111 &= 100 + 10 + 1 \\ &= (10 \times 10) + (10 \times 1) + 1 \\ &= (100 \times 1) + (10 \times 1) + 1 \end{aligned}$$

And this is always the case, although it is not always so obvious; *e.g.*, take the number 384, which can be thus decomposed:—

$$\begin{aligned} 384 &= 300 + 80 + 4 \\ &= (3 \times 100) + (8 \times 10) + (4 \times 1) \\ &= (3 \times 10 \times 10) + (8 \times 10 \times 1) + (4 \times 1) \\ &= 10 \text{ times } 10 \text{ times } 3 + 10 \text{ times } 1 \text{ times } 8 + 1 \text{ times } 4. \end{aligned}$$

But this is not the case in the compound rules. We make calculations to *different* bases or denominations; *e.g.*, pounds, shillings, pence, farthings; tons, cwts, etc. The principle is always the same practically; the “carrying” only differs. It will then be noticed that there is a combination of the simple and of something else. *This combination is called compound, and the rules dealing with such combinations compound rules.*

Explanation of Signs.—Pounds (£), shillings (s), pence (d), should be explained to the class. They are all derived from Latin words, which were the names of certain coins used by the Romans; and in each case the first letter of the Latin name is used as the symbol. The words might be written on the B.B., but the class need not yet be asked to learn them. It will be sufficient for the present to illustrate their origin. The words are *Libra*, *Solidus*, *Denarius*, *Quadrans* (farthings used to be represented by *Q.*). Treat the other symbols similarly, *as they are wanted* (cwts., qrs., lbs., etc.). The tables and their symbols should be gradually introduced, only the most common given, and examples should be based upon them. It will be necessary to point out that farthings are now expressed as parts of a penny, thus:—

$$\begin{aligned} \frac{1}{4} &= \text{one-fourth of a penny} &= 1 \text{ farthing.} \\ \frac{1}{2} &= \text{one-half of a penny} &= 1 \text{ halfpenny.} \\ \frac{3}{4} &= \text{three-fourths of a penny} &= 3 \text{ farthings.} \end{aligned}$$

How Taught.—The compound rules should be taught by *Comparison* and *Contrast* with the Simple Rules. The two may be connected, and by carefully framed examples the class may be led to discover the rules for compound addition for themselves. But first of all the necessary tables should have been learned,

and plenty of mental exercises should be given on them. Set the following example on B.B. :—

$\begin{array}{r} \text{\textit{f.}} \quad \text{\textit{s.}} \quad \text{\textit{d.}} \\ 3 \quad 4 \quad 2\frac{1}{2} \\ 5 \quad 9 \quad 7\frac{1}{2} \\ 6 \quad 8 \quad 3\frac{1}{2} \\ 2 \quad 6 \quad 8\frac{1}{2} \end{array}$	$=$	$\begin{array}{r} \text{\textit{f.}} \quad \text{\textit{s.}} \quad \text{\textit{d.}} \\ 3 \quad 4 \quad 2 \\ 5 \quad 9 \quad 7 \\ 6 \quad 8 \quad 3 \\ 2 \quad 6 \quad 8 \end{array}$	$\begin{array}{r} \text{\textit{f.}} \\ 1 \\ 2 \\ 3 \\ 2 \end{array}$
$\begin{array}{r} 17 \quad 8 \quad 10 \end{array}$		$\begin{array}{r} 16 \quad 27 \quad 20 \\ 1 \quad 1 \quad 2 \end{array}$	$\begin{array}{r} 8 \\ 2 + 0 \end{array}$
$\begin{array}{r} 17 \end{array}$		$\begin{array}{r} 28 \end{array}$	$\begin{array}{r} 22 \end{array}$
		$\text{\textit{I}} + 8$	$\text{\textit{I}} + 10$

- (a) Make a simple addition of each column, and let the class add them.
(b) The "compound" element comes in in two ways:—

1. In the conversion of the total in each case; e.g., 22 pence become 1 shilling and 10 pence.
2. In the carrying; 22 pence do not give 2 and carry 2 as in simple addition, but the 10 pence are placed under the pence column and the 1 shilling is carried to the shillings column.

The difference will thus be seen to be one of denomination. In the *simple* the sum is divided by 10 always; in the compound by 20, 12, or 4, or other numbers depending on the tables used. The reason for leaving the farthings blank should be pointed out. The principle is the same for compound subtraction.

The Compound Rules Criticised.

1. They are cumbrous and difficult to learn.
2. They are extravagant in time and energy.
3. The Metric System, if adopted in its entirety, would render their existence unnecessary, and would make the work simpler, swifter, and more economical.
4. They militate against our trade on the authority of good judges. Foreign nations, in some cases, are showing some reluctance to be bothered with trade transactions involving a knowledge of our cumbrous system.
5. Nevertheless, there are serious *objections* to changing the system, although it would be better if a national effort were made to overcome these. The change would be a shock to custom, to habit, and to business. It would also be very expensive, for the coinage would have to be recast. There is also the reluctance of adults to be bothered with the learning of any new system.

COMPOUND SUBTRACTION.

- x. Recapitulate simple subtraction as applied separately to pounds, shillings, pence, and farthings, thus :—

<i>£</i>	<i>s.</i>	<i>d.</i>	<i>f.</i>
1684	384	261	813
1297	196	199	724

2. Give easy examples of compound subtraction, *e.g.* :—

£	s.	d.	£	s.	d.
18	19	10½	728	16	8½
4	13	5½	613	8	3½

Such examples as these present no difficulty, and are understood at once.

3. Follow with more difficult examples in which "borrowing" is necessary.
The result can be obtained—

- (a) By the method of decomposition.
(b) By the method of equal additions.
(c) By the method of complementary addition.

By Decomposition.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 1983 \quad 14 \quad 4\frac{1}{2} \\ 694 \quad 16 \quad 8\frac{3}{4} \\ \hline \end{array} = \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 1982 \quad 33 \quad 15\frac{1}{4} \\ 694 \quad 15 \quad 8\frac{3}{4} \\ \hline 1288 \quad 17 \quad 7\frac{1}{2} \end{array}$$

Equal Additions.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 1983 \quad 14 \quad 4\frac{1}{2} \\ 694 \quad 16 \quad 8\frac{3}{4} \\ \hline \end{array} = \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 1983 \quad 34 \quad 16\frac{1}{4} \\ 695 \quad 17 \quad 9\frac{3}{4} \\ \hline 1288 \quad 17 \quad 7\frac{1}{2} \end{array}$$

Complementary Addition.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 1983 \quad 14 \quad 4\frac{1}{2} \\ 694 \quad 16 \quad 8\frac{3}{4} \\ \hline 1288 \quad 17 \quad 7\frac{1}{2} \end{array} = \text{the complementary addition made.}$$

4. Introduce examples with missing denominations. The process is the same as before. Take as an example £19 os. 4d. - £7 8s. 5½d.

	Decomposition.	Equal Additions.	Compl. Addition.
£ s. d.	£ s. d.	£ s. d.	£ s. d.
19 0 4	18 19 15½	19 20 16½	19 0 4
7 8 5½	7 8 5½	8 9 6½	7 8 5½
<u>11 11 10½</u>	<u>11 11 10½</u>	<u>11 11 10½</u>	<u>11 11 10½</u>

COMPOUND MULTIPLICATION.

By One Figure.

1. The class should have previously learned the pence and shillings tables, and should have received plenty of exercises in mental arithmetic preparatory to compound multiplication. Assuming this to have been done, the pupils should then be ready mentally to proceed as follows:—

Take as an example £18 13s. 7½d. × 5.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 18 \times 5 = 90 \\ 13\text{s.} \times 5 = 65\text{s.} = 3 \quad 5 \quad 0 \\ 7\text{d.} \times 5 = 35\text{d.} = 0 \quad 2 \quad 11 \\ \frac{3}{4} \times 5 = 15\text{f.} = 0 \quad 0 \quad 3\frac{3}{4} \\ \hline \therefore \text{£}18 \quad 13\text{s.} \quad 7\frac{1}{2}\text{d.} \times 5 = \text{£}93 \quad 8\text{s.} \quad 2\frac{3}{4}\text{d.} \end{array}$$

2. Set out the example on the B.B., and work it by the ordinary method.

The class will readily understand the reason of the rule from the analysis given in the previous step. They will see that the *principle* is the same as in simple multiplication, but that the *denominations* vary. In simple multiplication it is always 10; in compound it varies, being 10 for the pounds, because 10 is the basis; 20 for the shillings, because 20s. = £1; 12 for the pence, because 12d. = 1s.; and being 4 for the farthings, because 4 farthings = 1d.

The class thus discovers what the *practice* is, *viz.*, to reduce each denomination to the next higher denomination, *e.g.*—

farthings to pence (d)
pence to shillings (s)
shillings to pounds (£).

3. Plenty of exercises should be given for practice.

By Two Figures.

Take as an example £4 13s. 6½d. × 49.

1. Take the same digits 41362 and multiply as in simple multiplication—

$$\begin{array}{r}
 41362 \\
 \times 49 \\
 \hline
 372258 \\
 165448 \\
 \hline
 2026738
 \end{array}
 \quad
 \begin{array}{l}
 49 \text{ decomposed} = 40 + 9 \\
 = 9 \times 41362 \\
 = 40 \times 41362 \\
 = 49 \times 41362
 \end{array}$$

2. Now factor or decompose 49 in other ways and compare them—

$$49 = 40 + 9 = (4 \times 10) \times 9$$

$$\begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \\
 4 \quad 13 \quad 6\frac{1}{2} \times 9 \\
 \hline
 10
 \end{array}$$

$$\begin{array}{r}
 46 \quad 15 \quad 5 \\
 \hline
 4
 \end{array}
 = 10 \times \text{£}4 \quad 13\text{s.} \quad 6\frac{1}{2}\text{d.}$$

$$\begin{array}{r}
 187 \quad 1 \quad 8 \\
 42 \quad 1 \quad 10\frac{1}{2} \\
 \hline
 225 \quad 3 \quad 6\frac{1}{2}
 \end{array}
 = (4 \times 10) \times \text{£}4 \quad 13\text{s.} \quad 6\frac{1}{2}\text{d.}$$

$$\begin{array}{r}
 42 \quad 1 \quad 10\frac{1}{2} \\
 \hline
 225 \quad 3 \quad 6\frac{1}{2}
 \end{array}
 = 9 \times \text{£}4 \quad 13\text{s.} \quad 6\frac{1}{2}\text{d.}$$

3. Lead the class to grasp intelligently the following facts:—

- Factor or decompose the multiplier.
- Multiply each factor in its proper position.
- Multiply farthings and reduce to pence; multiply pence and reduce to shillings; shillings to pounds.
- Never place a cypher in the farthing product—in the example given it would convert the 5d. into 50d. if a cypher were added to indicate the absence of farthings.
- The *principle* is the same both in simple and compound, but the *denomination* is different.

Different Methods.—There are several methods of working multiplication—(1) By factors; (2) By decomposition; (3) Without factors or decomposition; (4) By special method; (5) By practice.

Here the first four methods only will be considered. The same example should be worked by each method on the B.B., the teacher explaining each step as he introduces it; but this should not be done too soon, as it brings obscurity instead of clearness.

By Factors.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 4 \quad 13 \quad 6\frac{1}{2} \times (7 \times 7). \\ \hline 7 \end{array}$$

$$\begin{array}{r} 32 \quad 14 \quad 9\frac{1}{2} \\ \hline 7 \end{array} = 7 \text{ times top line.}$$

$$229 \quad 3 \quad 6\frac{1}{2} = 7 \times 7 \text{ times top line.}$$

Special Method.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 4 \quad 13 \quad 6\frac{1}{2} \times (50 - 1). \\ \hline 10 \end{array}$$

$$\begin{array}{r} 46 \quad 15 \quad 5 \\ \hline 5 \end{array} = 10 \text{ times top line.}$$

$$\begin{array}{r} 233 \quad 17 \quad 1 \\ \hline 4 \quad 13 \quad 6\frac{1}{2} \end{array} = 5 \times 10 \text{ times top line.}$$

$$4 \quad 13 \quad 6\frac{1}{2} = 1 \text{ times top line.}$$

$$229 \quad 3 \quad 6\frac{1}{2} = (50 - 1) = 49 \text{ lines.}$$

Direct Method.

£	s.	d.	farthings.	pence.	shillings.	pounds.
4	13	6½	49	49	49	49
			2	6	13	4
<hr/>						
229	3	6½	4)98	294	147	196
			24½	24	49	33
				12)318	637	229
				26·6	26	
					20)663	
						33·3

The method by decomposition has already been demonstrated.

Remarks on the Methods.

1. It is claimed that the direct method ensures greater accuracy, but it is long and tedious in the setting out. It dispenses with the necessity for learning the compound tables, but what it may gain in accuracy it undoubtedly loses in time.
2. The special method is the best. Special methods usually are when available. The multiplication of 10 is easier than that of 7, while to subtract the top line is easier than to multiply by 9 and add.
3. Next to the special method factoring should be used where possible.
4. The method of decomposition is the one usually employed, because it lends itself to all cases.
5. Eventually all methods should be taught.
 - (a) The *mental training* is better. It helps to break the unintelligent rule of thumb work, now rapidly becoming a thing of the past in our schools. It develops more mental resource by more fully revealing the truths contained.
 - (b) It cultivates perception, and so gives *greater practical skill*. The child is taught to see readily the several methods of solution available.
 - (c) It develops *confidence* from a recognised wealth of working means.
 - (d) It adds *interest* from the variety of treatment.

COMPOUND DIVISION.—Compound division is the arithmetic process by which we find how many times one compound

(1)	℥	s.	d.	℥	s.	d.	(2)	℥	s.	d.	℥	s.	d.
4)9	18	3½	(2	9	6¾		4)9	18	3½	(2	9	6¾	
	8							8					
	—							—					
	1							1					
	20							20					
	—							—					
4)38	(9s.							38					
	36							36					
	—							—					
	2							2					
	12							12					
	—							—					
4)27	(6d.							27					
	24							24					
	—							—					
	3							3					
	4							4					
	—							—					
4)14	(¾							14					
	12							12					
	—							—					
	2							2					

The Compound Tables.—Their *common uses* may be briefly enunciated as follows:—

1. **Money.**—For buying and selling. Wages, interest, discount, rent, etc., are really cases of buying and selling.

2. **Avoirdupois.**—Coals, bread, potatoes, butter, cheese, and many other articles of domestic and everyday life are bought by avoirdupois; in the trades, tons of iron, stone, minerals, etc., are bought and sold; in the manufactures, for the measurement of force, of cargoes, loads, and our own weight; the weight of the atmosphere, and in an infinity of ways, this table is in constant use.

3. **Liquid.**—This will include ale and beer measure and wine measure. But beyond barrels and gallons it is scarcely necessary to go. Milk, beer, porter, etc., are bought by the masses in small quantities—the half pint, the pint—rarely in quarts, gallons, or barrels. Stout is usually sold by the bottle, wine by the bottle also; spirits in small quantities and by the bottle. Non-intoxicating drinks are usually sold in bottles, while water is generally measured by gallons.

4. **Long Measure.**—For measuring distance, great or small; e.g., a man walks so many miles; a ship steams or sails so many knots; one runs so many yards in so many seconds, etc. It is largely used in mathematical geography and in astronomy, in all sorts of trades, in shopping, in estimating our own height, etc.

5. **Square Measure.**—This table is required for boys only. It is used for surveying land, for the sale of carpets, oil cloths, ordinary cloths, calicoes and stuffs; for the wood trades, like the lumber trade, carpentry, and cabinet making; for the measurement of surfaces, whether land or water, and for many other purposes which will be within the experience or knowledge of the children.

6. **Cubic Measure.**—For the estimation of bulk, volumes, gases, solid bodies, etc.

7. **Time Measure.**—The clock, watch, and chronometer sufficiently indicate the use of this table. Time is sometimes a measurement of space to be covered, as in trains and boats; of wages to be paid, as with workmen; of day and night; of weeks, months, years, centuries, cycles of time, etc. It is also used in longitude.

8. Capacity.—Some vegetables and fruits fall under this table. We speak of a bushel of potatoes, a sieve of apples, a peck of peas, a gallon of apples, etc.

9. Troy and Apothecaries.—These are not common tables, and should only be taught under special circumstances.

In teaching the compound rules under weights and measures, the same methods should be adopted as in the case of compound money rules. The principles will be the same; the tables with their varying denominations will furnish the only difference.

REDUCTION—HOW TO TEACH IT.

Truths, Rules, Definitions.	Teaching.
<p>I. Truths.</p> <p>1. Quantities can be and are expressed in terms of the same unit.</p> <p>2. Quantities can be changed from one denomination to another.</p> <p>II. Definition.</p> <p>When we convert or change a quantity from one denomination to another, we are said to <i>reduce</i> it, and the process is called <i>Reduction</i>.</p> <p>III. Descending Reduction.</p> <p>In these cases the change is made from a unit of higher value to one of lower value.</p> <p>1. Simple Qualities.</p> <p>Reduce £5 to farthings.</p> $\begin{array}{r} \text{£}5 \\ 20 \\ \hline 100 \text{ shillings in } \text{£}5. \\ 12 \\ \hline 1200 \text{ pence in } \text{£}5. \\ 4 \\ \hline 4800 \text{ farthings in } \text{£}5. \\ \hline \text{£}5 = 4800 \text{ farthings.} \end{array}$ <p>2. Mixed Quantities.</p> <p>Quantities are often expressed as a mixture of several denominations, e.g., £18 12s. 4½d. Here</p>	<p>I. 1. Show a sum of money composed of the same coins, e.g., 5s. in 5 separate shillings; or 1s. in 12 pennies; or 6d. in 12 half-pennies. <i>The quantity or sum of money in each case is expressed in terms of the same unit.</i></p> <p>2. Show a shilling and 12 pennies. We can speak of it as a shilling or 12 pence. Show a penny and 4 farthings. We can speak of it as a penny or 4 farthings. <i>In each case the denomination or name is changed.</i></p> <p>II. The class should now give a definition of reduction. If they fail to do it vary and increase the examples until they succeed.</p> <p>They must notice carefully that the values of these quantities are not altered by the reduction. <i>The value remains the same; the names only are altered.</i></p> <p>III. The great thing in reduction is to see that the scholars know the value of each denomination as they reach it. To ensure this the teacher should always insist on the denominational name being written against each step in the reduction.</p> <p>1. The process might be fully explained thus:—</p> <p>First Step.</p> $\text{£}1 = 20\text{s.}$ <p>Then $\text{£}5 = 5 \times 20\text{s.} = 100\text{s.}$</p> <p>Second Step.</p> $1\text{s.} = 12\text{d.}$ <p>Then $100\text{s.} = 100 \times 12\text{d.} = 1200\text{d.}$</p> <p>Third Step.</p> $1\text{d.} = 4\text{f.}$ <p>Then $1200\text{d.} = 1200 \times 4\text{f.} = 4800 \text{ farthings.}$</p> <p>Educe "descending" thus:—</p> <p>A shilling is less than £1; a penny is less than a shilling; a farthing is less than a penny. Hence the unit becomes less, or <i>descends</i> in value each step, and the process is therefore called <i>descending reduction</i>.</p> <p>2. Reduce £18 12s. 4½d. to farthings.</p>

REDUCTION—HOW TO TEACH IT—*continued*.

Truths, Rules, Definitions.	Teaching.
<p>we have four denominations—pounds, shillings, pence, farthings.</p> <p>Reduce—</p> $\begin{array}{r} \text{£}18\ 12s.\ 4\frac{1}{2}d. \text{ to farthings.} \\ \hline 20 \\ \hline 372 \text{ shillings in } \text{£}18\ 12s.\ 4\frac{1}{2}d. \\ \hline 12 \\ \hline 4468 \text{ pence in } \text{£}18\ 12s.\ 4\frac{1}{2}d. \\ \hline 4 \\ \hline 17874 \text{ farthings in } \text{£}18\ 12s.\ 4\frac{1}{2}d. \end{array}$ <p>Rules for Mixed Quantities.</p> <ol style="list-style-type: none"> 1. Reduce the highest denomination (£) to the next lower (shillings), and add in the odd shillings (12). 2. Then reduce this total number of shillings (372) to the next lower denomination (pence), and add in the odd pence (4). 3. Then reduce the total number of pence (4468) to the next lower denomination (farthings), and add in the odd farthings (2). The total number of farthings is the answer. <p>IV. Ascending Reduction.</p> <ol style="list-style-type: none"> 1. Of simple cases; <i>e.g.</i> :— Reduce 17874 farthings to pounds (£). 2. Of mixed cases; <i>e.g.</i> :— Reduce 2698 hrs. 12 mins. 50 secs. to weeks. 	<p>First Form.</p> <p>(a) £1 = 20s. $\therefore \text{£}18 = 18 \times 20 = 360s.$ Add the odd 12s. Total = 372s. <i>i.e.</i>, £18 12s. = 372s.</p> <p>(b) 1s. = 12 pence. $\therefore 372s. = 372 \times 12d. = 4464d.$ Add in the odd pence 4 Total = 4468d. <i>i.e.</i>, £18 12s. 4d., or 372s. and 4d. = 4468d.</p> <p>(c) 1d. = 4 farthings. $\therefore 4468d. = 4468 \times 4f. = 17872f.$ Add in the odd farthings 2 Total = 17874f. <i>i.e.</i>, £18 12s. 4½d. = 17874 farths.</p> <p>Second Form. The links between the respective denominations can then be shown thus :—</p> $\begin{array}{r} \text{£} \quad s. \quad d. \\ 18 \quad 12 \quad 4\frac{1}{2}d. \\ \hline 20 \\ \hline 360 + 12 = 372s. \\ \hline 12 \\ \hline 4464 + 4 = 4468d. \\ \hline 4 \\ \hline 17872 + 2 = 17874f. \end{array}$ <p>Third Form. This will be the ordinary form as shown opposite. The teacher should now vary the examples by working cases in weights and measures. They will observe that the principle is the same in all cases, the denominations only varying. The class should then be able to state the rules for mixed reduction.</p> <p>IV. Pursue the same principle as in descending reduction. The only difference is one of process—the substitution of division for multiplication.</p>

THE G.C.M. OR THE H.C.F.—This process is known as finding the Greatest Common Measure or the Highest Common Factor of

two or more numbers. The children should be familiarised with both terms, but perhaps the second one is preferable. The connection between the two terms should be shown.

1. Take as an example the H.C.F. of 168 and 280.

$$\begin{array}{rcl} 168 & = & 3 \times 7 \times 8 \therefore 3 \text{ is a factor of } 168 \\ & & \text{and } 7 \quad " \quad " \quad " \\ & & \text{and } 8 \quad " \quad " \quad " \\ 280 & = & 5 \times 7 \times 8 \therefore 5 \quad " \quad " \quad 280 \\ & & \text{and } 7 \quad " \quad " \quad " \\ & & \text{and } 8 \quad " \quad " \quad " \end{array}$$

Now 7 is found in both \therefore it is a common factor of both.

and 8 " " " " " " " " " " " "

$\therefore 7 \times 8$ or 56 is a common factor of both.

Then we have 3 factors common to both, 7, 8, and 56. For the quantities can be expressed—

$$\begin{array}{ll} \text{as } 5 \times 7 \times 8 = 280 & \text{or as } 5 \times 56 = 280 \\ \text{and as } 3 \times 7 \times 8 = 168 & \text{or as } 3 \times 56 = 168. \end{array}$$

Of these 3 common factors 56 is the greatest or highest \therefore 56 is the H.C.F. of 168 and 280.

2. Now work the sum by the ordinary process, explaining the rule as you go.

$$\begin{array}{r} 168 \overline{)280} 1 \\ \underline{168} \\ 112 1 \\ \underline{112} \\ 56 112 2 \\ \underline{112} \end{array}$$

The rule is to divide the smaller number into the larger, and let the divisor of one step become the dividend of the next, until there is no remainder. The last divisor then becomes the H.C.F.

3. Then illustrate the truth of the process in the following way, which is recommended for its simplicity and its graphic nature, the usual methods of explanation being a little too difficult for some of the children.

$$\begin{array}{r} 56 \times 3 \overline{)56 \times 5} 1 \\ \underline{56 \times 3} \\ 56 \times 2 \overline{)56 \times 3} 1 \\ \underline{56 \times 2} \\ 56 \times 1 \overline{)56 \times 2} 2 \\ \underline{56 \times 1} \end{array}$$

By this method the pupil sees the reason of the process, and notices that 56 is a common measure of the two numbers; for it is a common factor of every divisor, dividend, and subtrahend in the operation. It is therefore common to both, and as it has been shown to be the greatest factor, it is there-

fore the Highest Common Factor of 168 and 280.

4. The Usual Reason for the Process might be given later on as follows: Take any two numbers, as 35 and 112, and factor them.

$$35 = 7 \times 5; \quad 112 = 7 \times 16.$$

Then 7 is a common factor of 35 and 112;

And 7 is also a factor of their sum, i.e., of $35 + 112$, or 147.

And 7 is also a factor of their difference, i.e., of $112 - 35$, or 77.

Also 7 is a factor of 6×35 , or any other multiple of 35.

And 7 is a factor of 8×112 , or any other multiple of 112.

From a study of these truths the class ought to be able to enunciate the following proposition:—

A Common Factor of any two numbers is also a factor of their sum, of their difference, and of any multiple of either of them.

The reason for the process will be found to depend on this proposition. For take the two original numbers 168 and 280.

Any number which measures 280 and 168 also measures their difference, 112.

It is also a measure of the difference of 168 and 112, i.e., 56.

It therefore measures any multiple of 56, as 1×56 .

And therefore since 56 is a factor of itself and of 112, it is also a factor of 168 and 280.

Also 56 is the *Highest Common Factor* of the given numbers, for it has been shown that any number which is a factor of 168 and 280 is also a factor of 56, and since 56 is the *highest factor of itself*, it is the *Highest Common Factor* of 168 and 280.

5. As soon as possible the teacher should accustom the class to set their work out by the short method, as it is much neater and better training. The work is shown in parallel columns, more of it being done mentally, the answer to each subtraction only being shown.

$$\begin{array}{r|l} 168 & 280 \\ \hline 56 & 112 \end{array} \quad 56 \text{ being the H.C.F.}$$

LEAST COMMON MULTIPLE.

I Prime Factors.—First show the class how to reduce any given number to its *prime* factors, as a knowledge of this is necessary for the proper understanding of the process by which the L.C.M. is found. Take 7560 as an example.

- | | |
|--|-----------------------|
| (a) The class will notice that the factors must be <i>prime</i> , i.e., they are divisible by no other number. | $7 \overline{) 7560}$ |
| (b) The prime factors consist of all the divisors and the last remainder. | $3 \overline{) 1080}$ |
| (c) The factors multiplied together equal the given number, e.g.— | $3 \overline{) 360}$ |
| | $3 \overline{) 120}$ |
| | $2 \overline{) 40}$ |
| | $2 \overline{) 20}$ |
| | $2 \overline{) 10}$ |
| | 5 |

$$7 \times 3 \times 3 \times 3 \times 2 \times 2 \times 2 \times 5 = 7560.$$

II A Multiple.—Next lead the class to discover what is meant by a multiple. Take any three numbers, as 56, 108, and 360, and deal with them thus :—

$$7 \times 2 \times 2 \times 2 = 56$$

$$3 \times 2 \times 2 \times 3 \times 3 = 108$$

$$2 \times 2 \times 3 \times 3 \times 2 \times 5 = 360$$

- (a) The class is to note that in each case we have found the *prime factors* of each number.
- (b) That 56 is a *multiple* of 7, and 2, and 2, and 2.
That 108 is a *multiple* of 3, 2, 2, 3, and 3.
That 360 is a *multiple* of 2, 2, 3, 3, 2, and 5.

The term *multiple* should then be compared with the term *product*, with which they are already familiar.

III A Common Multiple.—Take the prime factors of the 3 quantities and multiply together all their prime factors, e.g.—

$$(7 \times 2 \times 2 \times 2) \times (3 \times 2 \times 2 \times 3 \times 3) \times (2 \times 2 \times 3 \times 3 \times 2 \times 5) = 2177280.$$

Then 2177280 is a multiple of 56, for it contains the prime factors of 56.

It is also a multiple of 108, for it contains the prime factors of 108.

It is also a multiple of 360, for it contains the prime factors of 360.

It is therefore a multiple *common* to them all, *i.e.*, it is a *common multiple* of them all.

IV. The Least Common Multiple.

$(7 \times 2 \times 2 \times 2)$ is a *multiple* of 56, because it contains $(7 \times 2 \times 2 \times 2)$ the prime factors of 56.

And $(7 \times 2 \times 2 \times 2) \times (3 \times 3 \times 3)$ is a *multiple* of 108, because it contains $(3 \times 2 \times 2 \times 3 \times 3)$ the prime factors of 108. It is also a multiple of 56, because it contains $(7 \times 2 \times 2 \times 2)$ the prime factors of 56. It is therefore a *common multiple* of 56 and 108.

Again $(7 \times 2 \times 2 \times 2) \times (3 \times 3 \times 3) \times (5)$ is a *multiple* of 360, because it contains $(2 \times 2 \times 3 \times 3 \times 2 \times 5)$ the prime factors of 360. It is also a *multiple* of 108, for it contains $(3 \times 2 \times 2 \times 3 \times 3)$ the prime factors of 108; it is also a *multiple* of 56, for it contains $(7 \times 2 \times 2 \times 2)$ the prime factors of 56. It is therefore a *common multiple* of 360, 108, and 56. It is also the *least common multiple*, because the *least number possible of prime factors* is taken to produce it. Therefore $7 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5$ or 7560 is the *least common multiple* of 56, 108, and 360.

How to Find the L.C.M.—Take as an example 2, 4, 6, 7, 21, 32.

Now $4 = 2 \times 2$; hence 2 is a factor of 4, and 4 is a multiple of 2.

And $32 = 4 \times 8$; " 4 " 32, " 32 " 4.

And $21 = 7 \times 3$; " 7 " 21, " 21 " 7.

From which it is evident that *if one number contains another number an exact number of times, the number which contains the other is a multiple of that other.* Hence we may leave out of consideration all those numbers which are factors of other numbers.

Now it has been shown that 2 is a factor of 4,

and that 4 " 32,

and that 7 " 21,

\therefore the numbers 2, 4, and 7 may at once be struck out, thus:—

$$2 \mid 2, 4, 6, 7, 21, 32$$

$$8, 21, 16$$

$$\text{And L.C.M.} = 2 \times 21 \times 16 = 672.$$

Next 2 is a common measure of 6 and 32, hence divide them by 2.

Next 3 is a factor of 21, and can therefore be struck out.

There is no factor beyond unity common to 21 and 16, hence the L.C.M. will be the product of the divisors into the remaining quotients (21, 16).

$$\text{i.e., L.C.M.} = 2 \times 21 \times 16 = 672.$$

Another Method.—Reduce 2, 4, 6, 7, 21, and 32 to their prime factors.

$2 = 2$ $4 = 2 \times 2$ $6 = 2 \times 3$	$7 = 7$ $21 = 3 \times 7$ $32 = 2 \times 2 \times 2 \times 2 \times 2$
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Then L.C.M. of 2 is 2.

And " 4 and 2 is 2×2 .

" " 6 and 4 and 2 is $3 \times 2 \times 2$.

" " 7 and 6 and 4 and 2 is $7 \times 3 \times 2 \times 2$.

" " 21 and 7 and 6 and 4 and 2 is $7 \times 3 \times 2 \times 2$.

" " 32 and 21 and 7 and 6 and 4 and 2 is $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 3 = 672$.

The first method is the safer one, and a harder example worked by that method is here given.

Find L.C.M. of 12, 16, 18, 28, 32, 40, 42.

2 | 12, 16, 18, 28, 32, 40, 42 16 is contained in 32.

2 | 6 9, 14, 16, 20, 21

2 | 3, 9, 7, 8, 10, 21 3 and 7 are contained in 21.

3 | 9, 4, 5, 21

3, 4, 5, 21

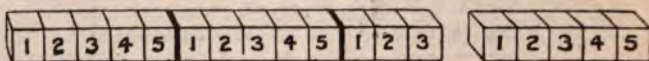
L.C.M. = $2 \times 2 \times 2 \times 3 \times 3 \times 4 \times 5 \times 21 = 10080$.

VULGAR FRACTIONS.—The practice adopted in many Arithmetics of postponing the teaching of fractions until after the compound rules have been mastered is hardly to be recommended. Where a child has mastered the four simple rules there is no reason why he should not at once proceed to learn fractions, both decimal and vulgar. The work involved is at least as easy as that involved in the working of the compound rules, and probably easier. When all those rules usually found intervening between simple division and fractions are learned, they can then be treated with more accuracy in practice and more profit to the mind. There will be no rejecting of fractions of a penny, and less restriction on the kind of example set for solution.

The *idea* of a fraction is easily given to children, and requires no elaborate teaching. Two apples might be taken, one of which might be cut into four equal parts, and the other into four unequal parts. To the equal parts we give the name of fractions, and to the unequal parts fragments. The class thus gets a clear idea of the fundamental attribute of a fraction, *viz.*, equality of division. There remains the word "vulgar" to explain as meaning "common," and the class will then understand that they are dealing with common fractions. The concrete illustrations can be multiplied and varied, if necessary.

Improper Fractions and Mixed Numbers.

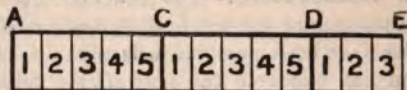
1. First explain and demonstrate the meaning of the terms Numerator and Denominator.
2. Then make the significance of a fraction clear by comparing the sign of division with a fraction; *e.g.*, \div and $\frac{3}{5}$. It will be seen that the dots are mere symbols representing any integers, or that the Numerator and Denominator take the places of the two dots.
3. Change $\frac{13}{5}$ into a mixed number. The class will understand that there is a unit which is divided into 5 equal parts, and that 13 such parts are taken to form the fraction. Obviously there is more than one unit in the fraction.
4. Demonstrate with kindergarten cubes.



Show a unit to the class. It contains 5 equal cubes or parts. Take 13 such cubes and build up units from them. There are 2 units and 3 cubes left; *i.e.*, 2 units and $\frac{3}{5}$ of a unit, which may be expressed as $2 + \frac{3}{5}$, and is expressed thus— $2\frac{3}{5}$. This is called a *mixed number*, because it is a mixture of whole numbers and a fraction.

The converse method can be similarly demonstrated.

By Diagram.—Draw a rectangle and divide it into 13 equal parts.



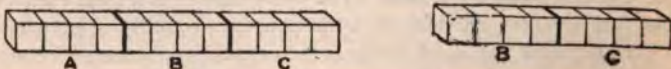
$$\begin{aligned}
 AC &= 1 \text{ unit} = 5 \text{ parts.} \\
 CD &= 1 \text{ unit} = 5 \text{ parts.} \\
 \therefore AD &= 2 \text{ units} = 10 \text{ parts.} \\
 \text{And } DE &= \frac{3}{5} \text{ units.} \\
 \therefore AE &= 2\frac{3}{5} \text{ units.} \\
 \text{But } AE &= 13 \text{ parts, or } 1\frac{3}{5} \text{ units.} \\
 \therefore 1\frac{3}{5} &= 2\frac{3}{5}.
 \end{aligned}$$

Addition and Subtraction of Fractions.

Vulgar Fractions can only be added or subtracted when expressed in terms of the same denomination. The meaning of this must be demonstrated to the class. Take following examples:—

Add $\frac{2}{3}$ and $\frac{3}{4}$. Subtract $\frac{3}{4}$ from $\frac{2}{3}$.

1. Take 12 kindergarten cubes of equal size and build these up into a unit. Divide these into 3 *equal parts*, as A, B, and C. Then separate 2 of



these parts as in fig. 2. The class will perceive that there are 2 parts out of 3, or $\frac{2}{3}$ parts out of 12;

i.e., there are $\frac{2}{3}$ or $\frac{8}{12}$.

2. Now take 12 similar cubes and divide them into 4 equal parts, as D, E, F, and G. Now separate 3 of these parts, as in fig. 4. The class will



perceive that here 3 parts out of the 4 have been removed, or 9 parts out of 12;

i.e., there are $\frac{3}{4}$ or $\frac{9}{12}$.

3. **Addition.**—Let the class count the cubes. There are 8 in one group and 9 in the other; or

$$8 + 9 = 17.$$

i.e., $\frac{8}{12} + \frac{9}{12} = \frac{17}{12} = 1\frac{5}{12} = 1\frac{1}{3} + \frac{5}{12} = 1 + \frac{5}{12} = 1\frac{5}{12}$.

4. **Subtraction.**—There are 9 cubes in one and 8 cubes in the other group.

Then $\frac{9}{12} - \frac{8}{12} = \frac{1}{12}$.

5. Now explain the ordinary arithmetic process. The class will understand the principle of the work with the teacher's help. If not, repeat with cubes and supplement with *diagram*.

Draw a line AB, and divide it into 4 equal parts. Draw AD at right angles to AB, and divide it into 3 equal parts of the same length as the parts in AB. Complete the parallelogram.

Then AEFB = $\frac{3}{4}$ or $\frac{9}{12}$.

And KGCB = $\frac{8}{12}$ or $\frac{8}{12}$.

Adding we have $\frac{3}{4} + \frac{8}{12}$, or $\frac{9}{12} + \frac{9}{12} = \frac{18}{12} = 1\frac{6}{12}$.

Subtracting we have $\frac{9}{12} - \frac{8}{12}$.

i.e., KGCB - AEFB = $\frac{9}{12} - \frac{8}{12} = \frac{1}{12}$.

6. **By Money.**—Deal with a shilling. Divide one shilling into 3 groups of 4d. each, and another shilling into 4 groups of 3d. each.

Then $\frac{8}{12} + \frac{9}{12} = 8d. + 9d. = 17d. = 1s. 5d.$

	A	K		B
	1	2	3	4
	5	6	7	8
E	9 H	10	11	12 F
	D	G		C

Multiplication of Fractions.

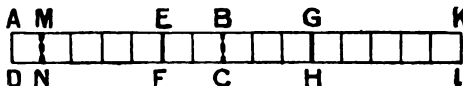
1. **To Multiply a Vulgar Fraction by an Integer.**—Take $\frac{5}{8} \times 4$ as an example.

1. **By Addition.**— $\frac{5}{8} \times 4 = \frac{5}{8} + \frac{5}{8} + \frac{5}{8} + \frac{5}{8} = \frac{20}{8} = 2\frac{4}{8} = 2\frac{1}{2}$.

2. **By Diagram.**—Take $\frac{5}{8} \times 3$ as an example.

Use coloured chalks to mark the various divisions.

As the new numerator will contain 15 units, 15 divisions will be required. The pupil will soon understand this.



Let fig. ABCD = unity, *i.e.*, it will contain 7 divisions.

Then AMND = $\frac{1}{7}$ of a unit

and AEFD = $5 \times$ AMND = $\frac{5}{7}$ of a unit

also $3 \times$ AEFD = $3 \times \frac{5}{7} = \frac{15}{7} = 2\frac{1}{7}$.

2. **By Money.**—Use a guinea as the unit and take the same example.

Then $\frac{1}{7}$ of a guinea = 3 shillings

and $\frac{5}{7}$ " " = $5 \times 3 = 15$ shillings

and $3 \times \frac{5}{7}$ " " = $3 \times 15 = 45$ shillings

= 2 guineas + 3 shillings = $2\frac{3}{7}$.

4. Other Methods.

(a) Four *apples* may be taken and cut into 8 equal parts each, 5 of these parts being taken in each case.

(b) Small *cubes* may be used. Eight would form a figure which would represent unity, and 5 parts could be taken from each.

The work could thus be set on the B.B., taking $\frac{5}{8} \times 4$ as an example.

$$\begin{aligned} 5 \times 4 &= 20 \\ \text{and } 5 \text{ eighths} \times 4 &= 20 \text{ eighths} \\ \text{i.e., } \frac{5}{8} \times 4 &= \frac{5 \times 4}{8} = \frac{20}{8} = 2\frac{2}{2} = 2\frac{1}{1}. \end{aligned}$$

Or again, 5 eighths $\times 4 = 20$ eighths, or 5 halves

$$\text{i.e., } \frac{5}{8} \times 4 = \frac{5 \times 4}{8 \div 4} = \frac{5}{2} = 2\frac{1}{2}.$$

N.B.—When possible divide the denominator for choice, since the product will then be expressed in its lowest terms.

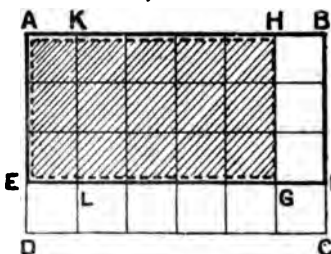
Rule Deduced.—To multiply a vulgar fraction by an integer, either multiply the numerator or divide the denominator by that integer.

II. To Multiply a Vulgar Fraction by a Vulgar Fraction.

Take $\frac{2}{3}$ of $\frac{3}{4}$ as an example.

1. By Diagram.—In constructing the figure let the pupils notice that the 2 denominators must be multiplied together to determine the number of little squares necessary, *i.e.*, they represent a rectangle 6 by 4.

Draw AB and divide it into 6 equal parts. Draw AD at right angles to AB and equal to 4 of these equal parts. Complete the rectangle ABCD. Through each of the points of division draw lines parallel to AB and AD. Then let ABCD = unity.



Then AEFB = $\frac{2}{3}$ of ABCD
and AELK = $\frac{1}{3}$ of AEFB = $\frac{1}{3}$ of $\frac{2}{3}$
and AEGH = $\frac{2}{3}$ of AEFB = $\frac{2}{3}$ of $\frac{2}{3}$.
Then AEGH is the figure required.

But AEGH contains 15 squares, and the total number of squares is 24, \therefore AEGH is $\frac{15}{24}$ of the whole, *i.e.*, $\frac{5}{8} \times \frac{3}{4} = \frac{15}{32}$.

2. By Money.

Take $\frac{2}{3}$ of $\frac{3}{4}$ of £1 as an example.

$$\begin{aligned} \frac{1}{4} \text{ of } £1 &= 5s. \\ \frac{3}{4} \text{ of } £1 &= 3 \times 5 = 15s. \\ \text{and } \frac{1}{3} \text{ of } \frac{3}{4} &= \frac{1}{3} \text{ of } 15 = 5s. \text{ 6d.} \\ \text{and } \frac{2}{3} \text{ of } \frac{3}{4} &= 5 \times 2s. \text{ 6d.} = 12s. \text{ 6d.} \\ \text{i.e., } \frac{2}{3} \times \frac{3}{4} &= \frac{2 \times 3}{3 \times 4} = \frac{2}{4} \text{ of } £1 = 12s. \text{ 6d.} \end{aligned}$$

3. Generally.

To find $\frac{2}{3}$ of $\frac{3}{4}$, the $\frac{3}{4}$ must be divided into 4 equal parts, and 3 of these parts must be taken.

Then each part is $\frac{3}{4 \times 4}$, and 3 such parts = $\frac{3 \times 3}{4 \times 4} = \frac{9}{16}$.

But $\frac{2}{3}$ of $\frac{3}{4}$ is the same as $\frac{2}{3}$ of $\frac{3}{4}$, for it means that $\frac{3}{4}$ must be divided into 6 parts, and therefore each part is $\frac{3}{4 \times 6}$, and 5 such parts = $\frac{5 \times 3}{4 \times 6} = \frac{15}{24} = \frac{5}{8}$.

Rule Deduced.—To multiply by a vulgar fraction, multiply by its numerator and divide the product by its denominator; or to multiply

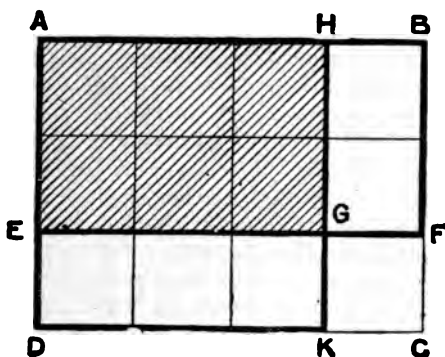
a fraction by a fraction, multiply the numerators for a new numerator and the denominators for a new denominator.

III. To Prove Multiplier and Multiplicand can be Interchanged Without Altering the Product.—To show that multiplicand \times multiplier = multiplier \times multiplicand.

$$\text{i.e., } \frac{3}{4} \times \frac{2}{3} = \frac{2}{3} \times \frac{3}{4}.$$

Do this by diagram, for the diagrams are useful to show the pupils how the product of 2 or more fractions may be *smaller* than either of the factors. This is otherwise a hard matter for the young mind to grasp, as it is apparently contrary to all their previous experience.

Let ABCD = the unit
 then AEFB = $\frac{3}{4}$ of ABCD
 and AEGH = $\frac{2}{3}$ of AEFB
 = $\frac{2}{3}$ of $\frac{3}{4}$ of ABCD.....(i.)
 = $\frac{1}{2}$



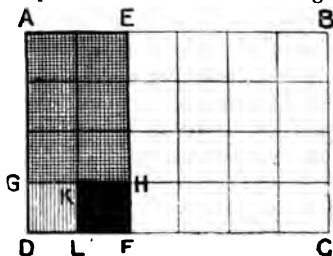
Again let ABCD be the unit
 then ADKH = $\frac{2}{3}$ of ABCD
 and AEGH = $\frac{3}{4}$ of ADKH
 = $\frac{3}{4}$ of $\frac{2}{3}$ of ABCD.....(ii.)
 = $\frac{1}{2}$

Hence comparing (i.) and (ii.) we see that $\frac{3}{4} \times \frac{2}{3} = \frac{2}{3} \times \frac{3}{4}$, for both equal $\frac{1}{2}$; i.e., the multiplier and multiplicand can both be interchanged without altering the product.

IV. Harder Examples.—
 Show that $\frac{1}{2}(\frac{1}{3} - \frac{1}{4}) = \frac{1}{24}$ by a diagram (scholarship).

Note.—As the denominator of the product is 24 that number of squares will be required.

Let ABCD = unity = $\frac{24}{24}$
 then each square = $\frac{1}{24}$
 Now AEFD = 8 squares = $\frac{8}{24} = \frac{1}{3}$
 and AGHE = 6 squares = $\frac{6}{24} = \frac{1}{4}$



Then $AEFD - AEHG = GDFH = 2$ squares and the $\frac{1}{2}$ of 2 squares = 1 square (KHFL) $\therefore \frac{1}{2}$ (AEFD - AEHG) = KHFL = $\frac{1}{2}$; i.e., $\frac{1}{2}(\frac{1}{2} - \frac{1}{4}) = \frac{1}{4}$.

DIVISION OF FRACTIONS.

Take as an example $\frac{2}{3} \div \frac{4}{5}$. Here we have to find a quotient which, when multiplied by $\frac{4}{5}$, shall give the product $\frac{2}{3}$.

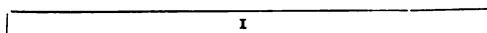
Then $\frac{2}{3}$ of this quotient = $\frac{2}{3}$
 therefore $\frac{2}{3}$ " " = $\frac{2}{3} \div 6$ or $\frac{2}{18}$
 and therefore this quotient = $\frac{2}{18} \times 7$ or $\frac{14}{18}$
 but $\frac{2}{3} \times \frac{7}{6} = \frac{2}{3} \times \frac{7}{6}$
 therefore $\frac{2}{3} \div \frac{4}{5} = \frac{2}{3} \times \frac{5}{4}$.

That is, to divide one fraction by another invert the divisor and multiply the dividend by the fraction thus inverted; or multiply the fraction by the reciprocal of the divisor.

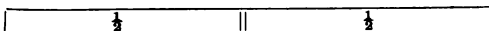
MECHANICAL AIDS FOR TEACHING FRACTIONS.—

There are several of these upon the market now, and the enterprise of different publishers keeps adding to their number. They are usually advertised with illustrations and explanations, and where the pupils cannot obtain the real thing, they are advised so far as it is possible to obtain specimens of these explanatory advertisements and to paste them in a book kept for that purpose. Two only are mentioned here as being typical, viz., *The Allied-Colour Fraction Chart*, and *Cowham's Fractions at a Glance*.

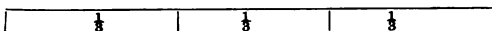
The Allied-Colour Fraction Chart.—This chart illustrates the elementary principles of fractions and their relations to other fractions by means of related colours. The chart consists of twelve bars printed in various colours, each being distinctly marked from unity up to twelfths respectively. It is claimed for it that it is invaluable in teaching mental arithmetic, and that it is a valuable addition to the various efforts made to represent graphically to the eye the comparative values of different simple fractions. By means of this attractive, brightly-coloured chart, it is asserted that the task is rendered much easier and more pleasant. The bars are all the same size, and by using similar colours it is seen that halves, fourths, sixths, eighths, tenths, and twelfths are relations; that three-sixths equal half, or five-tenths or six-twelfths. In the same way thirds, sixths, ninths, and twelfths are shown to be akin to each other; so are fifths and tenths; while sevenths and elevenths and unity have colours of themselves. The chart is $30 \times 21\frac{1}{2}$ inches, is well mounted and varnished, and is distinct enough to be seen across a large schoolroom. The following is a reduced copy of it:—



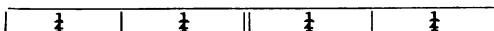
Colour almost black.



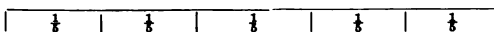
All red.



All yellow.

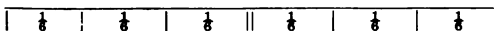


Obtained by dividing $\frac{1}{2}$ into halves, \therefore coloured the same—red.

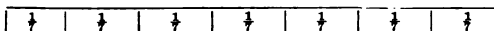


All blue.

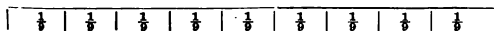
Obtained by dividing each third into halves, \therefore coloured the same as $\frac{1}{3}$ on the right and $\frac{1}{2}$ on the left, i.e., red on left and yellow on right.



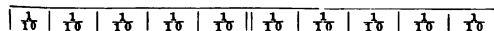
All green.



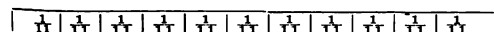
Obtained by dividing $\frac{1}{2}$ into halves, \therefore coloured the same—red.



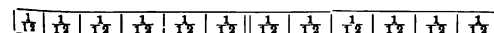
Obtained by dividing $\frac{1}{3}$ into thirds, \therefore coloured the same as $\frac{1}{3}$ —yellow.



Obtained by dividing each $\frac{1}{5}$ into halves, \therefore coloured same as $\frac{1}{5}$ on the right (blue), and $\frac{1}{2}$ on the left (red).



A separate colour.

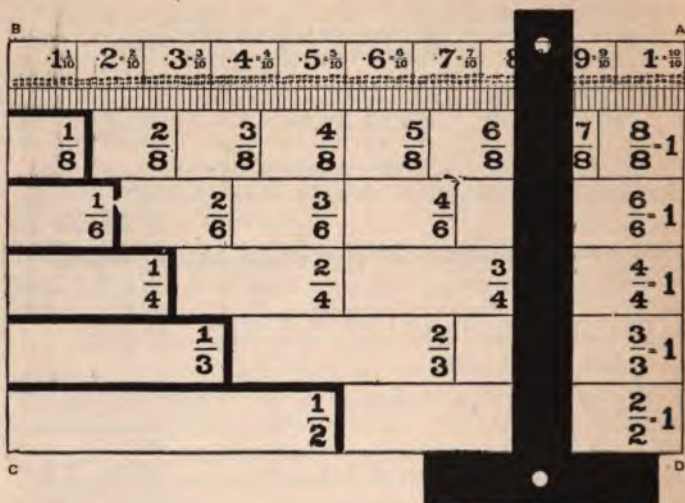


Obtained by dividing each $\frac{1}{6}$ into halves, \therefore coloured the same as $\frac{1}{6}$ on the right (yellow), and $\frac{1}{2}$ on the left (red).

Cowham's Fractions at a Glance.—This is a chart or diagram designed to make the rules of fractions both intelligible and interesting in a simple and effective manner. Special features are claimed for it, which are thus enumerated:—

1. A clear notion of the meaning of a "fraction" is given.
2. By moving the T square along the chart all the rules of fractions can be explained.
3. Much valuable knowledge is obtained by simple inspection of the chart by the scholars.

4. Full directions for use are printed on each chart.
5. The reasons for the rules of fractions may be illustrated and understood. The chart can be used for teaching the meaning of numerator and denominator, the comparison of fractions, the measuring of the common denominator of any series of fractions, addition, subtraction, multiplica-



tion, division, the difference between a vulgar and a decimal fraction, and the reduction of a vulgar to a decimal fraction. As a specimen of the way to use the chart an example in multiplication is chosen, *viz.*, $\frac{3}{4} \times \frac{1}{2}$.

The edge of the T square lies against $\frac{3}{4}$. By looking along the fourth slip you cannot see what the half of $\frac{3}{4}$ is, but $\frac{3}{8}$ is seen to coincide with $\frac{3}{4}$, and the $\frac{1}{2}$ of $\frac{3}{8}$ may be read off ($\frac{3}{16}$).

CANCELLING.

In teaching cancelling commence with the recapitulation of the following rule: *If we multiply the numerator and denominator of a simple fraction by the same number the value of the fraction is unaltered, e.g. —*

$$\frac{3}{4} = \frac{3}{4} \times \frac{2}{2} = \frac{6}{8}; \text{ again } \frac{6}{8} = \frac{6}{8} \times \frac{2}{2} = \frac{12}{16}.$$

The converse of this rule is also true. *If we divide the numerator and denominator of a fraction by the same quantity, supposing both to be divisible by that quantity, the value of the fraction is unaltered, e.g. —*

$$\frac{12}{14} = \frac{12 \div 2}{14 \div 2} = \frac{6}{7}, \text{ i.e., } \frac{6}{7} \text{ is equal to } \frac{12}{14}.$$

Illustrate by diagram.

$$\begin{aligned} ABCD &= \frac{2}{3} \text{ of } AEFB, \\ &= \frac{2}{3} \times \frac{2}{3} \text{ of } AEFB, \\ &= \frac{4}{9} \text{ of } AEFB, \end{aligned}$$

$$\therefore \frac{2}{3} \times \frac{2}{3} = \frac{4}{9} = \frac{2}{3} \times \frac{2}{3} = \frac{4}{9} \times \frac{3}{2} = \frac{2}{3}.$$

Cancelling out the 2's and 3's in the first fraction, and the 2's in the second we have $\frac{1}{3} = \frac{1}{3} = \frac{1}{3}$.

PRACTICE.

I. Name.—Make the class understand the reason for the name. It is so called because it is the *practice* of people in business to make their calculations by this way rather than by multiplication.

II. Method of Work.—The calculations are done by the addition of aliquot parts (*i.e.*, fractional parts). The value of a unit of one denomination is always given.

The teacher must explain aliquot (how many), and drill well in aliquot parts before any attempt is made to deal with examples. At first it will be best to confine the attention to the aliquot parts of the *money tables*, because the children will be more familiar with them.

III. Kinds.—There are two kinds, simple and compound.

1. Simple.—The given number is expressed in the same denomination as the unit whose value is given; *e.g.*, 220 articles at 15s. 6½d. each article. The unit whose value is given is one article, and the number is expressed in articles (220). The class should name what the unit is, and then decompose the 15s. 6½d. into 10s. + 5s. + 6d. + ½d. Then the

$$\begin{array}{llll} \text{Cost of 220 articles at 10s. each} = \frac{1}{2} \text{ the cost at } \pounds 1 \text{ each} = \pounds 110 & 0 & 0 \\ \text{,, } 5s. \text{ ,,} = \frac{1}{4} \text{ ,,} & \text{,,} & 10s. \text{ ,,} = & 55 & 0 & 0 \\ \text{,, } 6d. \text{ ,,} = \frac{1}{10} \text{ ,,} & \text{,,} & 5s. \text{ ,,} = & 5 & 10 & 0 \\ \text{,, } \frac{1}{2}d. \text{ ,,} = \frac{1}{20} \text{ ,,} & \text{,,} & 6d. \text{ ,,} = & 0 & 9 & 2 \end{array}$$

$$\therefore \text{,, } 15s. 6\frac{1}{2}d. \text{ ,,} = \underline{\underline{\pounds 170 \ 19 \ 2}}$$

The class should notice that aliquot or fractional parts were found for 10s., 5s., 6d., and ½d., and that these results were *added* together. The work might then be set out in the *ordinary form* and *compared* step by step with the explanatory work just done.

$$\begin{array}{llll} \pounds 220 & 0 & 0 = \text{cost at } \pounds 1 \text{ each.} \\ \hline 10s. = \frac{1}{2} \text{ of } \pounds 1 = & 110 & 0 & 0 = \text{,, } 10s. \text{ ,,} \\ 5s. = \frac{1}{4} \text{ of } 10s. = & 55 & 0 & 0 = \text{,, } 5s. \text{ ,,} \\ 6d. = \frac{1}{10} \text{ of } 5s. = & 5 & 10 & 0 = \text{,, } 6d. \text{ ,,} \\ \frac{1}{2}d. = \frac{1}{20} \text{ of } 6d. = & 0 & 9 & 2 = \text{,, } \frac{1}{2}d. \text{ ,,} \\ \hline \underline{\underline{\pounds 170 \ 19 \ 2}} & & & \underline{\underline{15s. 6\frac{1}{2}d.}} \end{array}$$

D	A						C					
	1	2	3	4	5	6						
	7	8	9	10	11	12						
	13	14	15	16	17	18						
	19	20	21	22	23	24						
	25	26	27	28	29	30						
	E						F					

The work should next be compared with multiplication, and shown to be shorter as a rule. Several examples should be worked on the B.B. by both methods so as to reveal the fact to the class; *e.g.*, work the following example on the B.B. by both methods, and the truth will be at once apparent: 456 articles at £2 10s. each.

2. Compound.—Here we find the value of a compound quantity when the value of a unit of *one* denomination is given; *e.g.*, rent of 15 ac. 3 ro. 36 po. at £9 4s. 6d. per acre.

Now the aliquot parts will be

either 2 rds. = $\frac{1}{2}$ ac.	or 2 rds. = $\frac{1}{2}$ of an ac.
1 rd. = $\frac{1}{2}$ of 2 rds.	1 rd. = $\frac{1}{2}$ of 2 rds.
20 pls. = $\frac{1}{2}$ of a rd.	20 pls. = $\frac{1}{2}$ of a rd.
10 pls. = $\frac{1}{2}$ of 20 pls.	8 pls. = $\frac{1}{2}$ of a rd.
5 pls. = $\frac{1}{2}$ of 10 pls.	8 pls. = $\frac{1}{2}$ of a rd.
1 pl. = $\frac{1}{2}$ of 5 pls.	

From a study of these lead the class to notice that aliquot parts can often be taken in more ways than one. With experience the pupils learn to select the most suitable.

When the unit whose value is given is not that of the highest denomination, it is best to alter either the price or the form of the quantity that it may be so; *e.g.*, 2 tons 4 cwts. 3 qrs. 25 lbs. @ 23s. per cwt. This can be done in several ways:—

- By reducing the denomination of the area, *i.e.*, by expressing it as 44 cwts. 3 qrs. 25 lbs.
- By expressing the price as £23 per ton, because if it be 23s. per cwt. it will be £23 per ton.
- As we may find the value at 23s. per ton, and multiply the answer by 20.

Work the example on the B.B. *by all three methods* and compare them.

RATIO.

Truths and Examples.	Teaching.												
<p>I. Introduction.</p> <p>II. Develop the Idea of Ratio.</p> <p>1. By Money.</p> <p>(a) $\frac{1}{2}d.$ is the half of $1d.$</p> <p>(b) $1s.$ is the $\frac{1}{20}$ of £1.</p> <p>(c) $5s.$ is $\frac{1}{4}$ of £1.</p> <p>(d) $1d.$ is $\frac{1}{12}$ of $1s.$</p> <p>2. By Diagram.</p> <p>III. Methods of Expressing Ratio.</p> <p>1. By fractions, as $\frac{3}{8}$.</p> <p>2. By words, as 3 is to 9.</p> <p>3. By symbols, as 3 : 9 (units), or as 1 : 3 (area).</p> <p>IV. Its Characteristics.</p> <p>1. It points out the relation between the numerator and the denominator of a fraction.</p>	<p>I. Question on the aliquot parts in practice, and upon the relation of the numerator to the denominator in fractions.</p> <p>II. 1. Elicit by questioning. By further questioning obtain that—</p> <p>(a) $1d.$ is twice as much as $\frac{1}{2}d.$</p> <p>(b) $\frac{1}{2}d.$ is twenty times as much as $1s.$</p> <p>(c) $\frac{1}{2}d.$ is four times as much as $5s.$</p> <p>(d) $1s.$ is twelve times as much as $1d.$</p> <p>2. Draw 2 rectangles on the B.B., and let one be 3 times the area of the other. Show the difference by measurement before the class. Divide the rectangles into equal units. Then the class will observe that B</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"><div style="text-align: center;"><p>A</p><table border="1" style="border-collapse: collapse; width: 50px; height: 100px;"><tr><td>1</td></tr><tr><td>2</td></tr><tr><td>3</td></tr></table></div><div style="text-align: center;"><p>B</p><table border="1" style="border-collapse: collapse; width: 100px; height: 100px;"><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td></tr><tr><td>7</td><td>8</td><td>9</td></tr></table></div></div> <p>is 3 times the size of A; or that A is $\frac{1}{3}$ the</p>	1	2	3	1	2	3	4	5	6	7	8	9
1													
2													
3													
1	2	3											
4	5	6											
7	8	9											

RATIO—continued.

Truths and Examples.	Teaching.
<p>2. It points out relative sizes or magnitudes.</p> <p>3. It only compares quantities of the same kind.</p> <p>V. Definition.</p> <p>Ratio is the relation which one quantity bears to another with respect to magnitude.</p> <p>VI. Truths of Ratio.</p> <p>Antecedent 1. $\frac{\text{Consequent}}{\text{Consequent}} = \frac{3}{3} = 1$.</p> <p>Consequent 2. $\frac{\text{Antecedent}}{\text{Consequent}} = \frac{3}{3} = 1$.</p> <p>Antecedent 3. Ratio = $\frac{\text{Antecedent}}{\text{Consequent}}$.</p> <p>Antecedent 4. Consequent = $\frac{\text{Antecedent}}{\text{Ratio}}$.</p> <p>Consequent 5. Antecedent = Ratio \times Consequent.</p>	<p>size of B; or that $\frac{A}{B} = \frac{1}{3}$; or A has 3 squares and B 9; i.e., $\frac{A}{B} = \frac{3}{9}$.</p> <p>III. Show the class these methods on the B.B., and let them test their knowledge by expressing the ratio in II., 1. The class should notice that ratio is found by dividing and not subtracting.</p> <p>IV. 1. Illustrate by reference to III., 1. 2. Illustrate by reference to the diagrams. 3. Deduce by questioning. Ask class to compare 3 boots and 4 houses, 7 marbles and 3 elephants, etc.</p> <p>The third characteristic will then be obvious to the children.</p> <p>V. The class should now be prepared to give the definitions of ratio, which should be written on the B.B. and learnt. They should then be asked to give a number of ratios, expressing them in three different ways. This will test the accuracy of their knowledge, e.g.— $\frac{3}{4}$, or 2 is to 3, or 2 : 3 $\frac{3}{5}$, or 4 is to 5, or 4 : 5, etc.</p> <p>VI. Give the names Antecedent and Consequent, with their meanings.</p> <p>Demonstrate these truths on the B.B. by the application of some of the ratios given by the class.</p> <p>Lead the class to discover that when any two of the three terms are given or known, the other can always be found.</p> <p>Recapitulate.</p>

PROPORTION.

Truths and Examples.	Teaching.						
<p>I. Introduction.</p> <p>II. Develop the Idea of Proportion.</p> <table> <tr> <td>5 : 10</td><td>15 : 30</td></tr> <tr> <td>7 : 21</td><td>3 : 9</td></tr> <tr> <td>8 : 40</td><td>20 : 100</td></tr> </table> <p>III. Methods of Expression.</p> <p>5 : 10 as 15 : 30 or $\frac{5}{10} = \frac{15}{30}$ 7 : 21 as 3 : 9 or $\frac{7}{21} = \frac{3}{9}$ 8 : 40 as 20 : 100 or $\frac{8}{40} = \frac{20}{100}$ or 5 : 10 :: 15 : 30.</p> <p>IV. Definition.</p> <p>Proportion is an equality of ratios.</p> <p>V. Truths of Proportion.</p> <p>1. Technicalities.</p> <p>The two end terms are called the</p>	5 : 10	15 : 30	7 : 21	3 : 9	8 : 40	20 : 100	<p>I. Recapitulate rapidly the chief points and truths of the lesson on ratio.</p> <p>II. Demonstrate the equality of ratios on the B.B.</p> <p>$\frac{5}{10} = \frac{1}{2}$ Therefore the ratio of $\frac{5}{10}$ is equal to the ratio of $\frac{1}{2}$; i.e., there is an equality of ratios. Illustrate and confirm with the other examples.</p> <p>III. Show this upon the B.B., and call attention to the final form.</p> <p>The teacher should then give a number of equal ratios, and the class should express them in the form of a proportion. The class should afterwards supply their own examples.</p> <p>IV. The pupils should now be able to give this definition. If they fail the work must be repeated with further explanation.</p> <p>V. 1. First give the technicalities and</p>
5 : 10	15 : 30						
7 : 21	3 : 9						
8 : 40	20 : 100						

PROPORTION—continued.

Truths and Examples.	Teaching.
<p>extremes, and the two inner terms the means; e.g.:— Extreme : Mean : Mean : Extreme, or 5 : 10 :: 15 : 30.</p> <p>2. Truths.</p> <p>(a) Either extreme = $\frac{\text{product of means}}{\text{other extreme.}}$</p> <p>(b) Either mean = $\frac{\text{product of extremes}}{\text{other mean.}}$</p> <p>3. Illustrations.</p> <p>(a) $5 = \frac{10 \times 15}{30}$ $30 = \frac{10 \times 15}{5}$</p> <p>(b) $10 = \frac{5 \times 30}{15}$ $15 = \frac{5 \times 30}{10}$</p> <p>VI. Applications of its Truths to the Rule of Three.</p> <p>Problem: Given any 3 of the 4 terms of a proportion, to find the 4th.</p> <p>Example. If 4 books cost 24s. what will 100 books cost at the same price?</p> <p>Reqd. cost = $\frac{24 \times 100}{4} = 600$ sh.</p> <p>The complete proportion becomes— 4 books : 100 books :: 24s. : 600s.</p> <p>Other Examples. A few other examples should be written here, some of which should be given by the teacher, and some by the class.</p>	<p>illustrate as opposite on the B.B. Elicit by questions that the terms are named from their position.</p> <p>2 and 3. These truths should not be told, but discovered by the use of the B.B. First the proportion should be again stated as in V. 1. on the B.B. Then the illustrations should be taken <i>seriatim</i>, and the result should come as a surprise to the class; e.g.: $5 \text{ (extreme)} = \frac{10 \text{ (mean)} \times 15 \text{ (mean)}}{30 \text{ (extreme)}} = 5.$</p> <p>The other cases should be dealt with on the B.B. in a similar way. The figures could then be rubbed out, the terms left standing, and the truths will stand revealed to the class, who should now be asked to reproduce them with illustrations on their slates from memory.</p> <p>VI. The class will be able to do this from what they know of the truths of proportion. Point out that 3 terms are given, and that it is required to find the 4th. Ask the class to express the ratios.</p> <p>First ratio $\frac{4 \text{ books}}{100 \text{ books}} = \frac{24s.}{\text{Req. No. of Sh.}}$ second ratio. Or 4 books : 100 books :: 24s. : Req. No. of S.</p> <p>Apply V. 2, and we get— Either extreme = $\frac{\text{product of means}}{\text{other extreme.}}$ then req. No. of s. (one extreme) = $\frac{100 \text{ (mean)} \times 24 \text{ (mean)}}{4 \text{ (other extreme)}}$ i.e., req. No. of s. = $\frac{100 \times 24}{4} = 600s.$ i.e., $\frac{4 \text{ books}}{100 \text{ books}} = \frac{24s.}{600s.}$ or 4 : 100 :: 24 : 600.</p>

The Unitary Method of Proportion.—The process here is much more simple and requires no explanation of ratio or proportion. We seek to find what is wanted from what is given by *passing through a unit common to both*; e.g., If 6 books cost 12s., what will 9 books cost at the same price?

Given that 6 books cost 12s.,
 Then 1 book (*common unit*) costs $\frac{12}{6} = 2s.$,
 \therefore 9 books cost $9 \times 2 = 18s.$

Advantages and Disadvantages of the Two Methods.

1. The Proportion Method.

- (a) It takes up and expands an Arithmetic principle which the children have already recognised in Practice and Fractions.

- (b) It offers a fine exercise for training the reasoning faculty.
1. By demanding that they shall see the relationship existing between terms when differently grouped.
 2. By requiring them to formulate the truths expressed; *e.g.*, the product of the extremes is equal to the product of the means.
- (c) It leads to guessing, and has a tendency to become purely mechanical, the truths embodied in it either being forgotten, or never properly understood.
- (d) It requires more time than the other method.

2. The Unitary Method.

- (a) Its great recommendation is its simplicity of principle.
- (b) It dispenses with the necessity for distinguishing between Simple and Compound Proportion.
- (c) It is generally a safer method than the other, for the terms, especially in Compound Proportion, are often misstated.
- (d) There is more intelligence accompanying its work, for its truths are easily grasped and remembered; and it does not so readily become mechanical.
- (e) Generally it is more expeditious.
- (f) It is usually the method preferred by examiners.

DECIMALS.

1. Notation and Numeration.—In teaching the notation of decimals, comparison should be made with the ordinary system of notation. So far as the whole numbers are concerned, the systems will be seen to be alike; the difference presents itself with the introduction of the decimal fractions.

In the ordinary system of notation any figure in the units place retains its *intrinsic* value, whilst every figure to the left of the units place acquires a *local* value; *i.e.*, a value dependent on its position. This value becomes *ten times greater for every place it is moved to the left*. Our ordinary system of notation is thus seen to have 10 for its basis. The teacher's work now is to show that the value of every digit in a system of decimal fractions becomes *ten times less for every place it is moved to the right*. This should be illustrated on the B.B. by suitable examples, and the type of example lending itself most readily to a lucid explanation is one composed entirely of the same digits; *e.g.*,

4444' 4444.

Decomposing this number we have—

$$\begin{array}{rcl}
 4000 + 400 + 40 + 4 + \cdot 4 + \cdot 04 + \cdot 004 + \cdot 0004. \\
 \text{i.e., } 4000 = 4 \times 1000 & \quad & \cdot 4 = 4 \times \frac{1}{10} = \frac{4}{10} \\
 400 = 4 \times 100 & \quad & \cdot 04 = 4 \times \frac{1}{100} = \frac{4}{100} \\
 40 = 4 \times 10 & \quad & \cdot 004 = 4 \times \frac{1}{1000} = \frac{4}{1000} \\
 4 = 4 \times 1 & \quad & \cdot 0004 = 4 \times \frac{1}{10000} = \frac{4}{10000}
 \end{array}$$

The teacher should now *tell* the class the respective names of the two portions constituting the decimal quantity. From this illustration it will be seen that the numbers to the left of the decimal point are called *integral* (whole numbers), and the part to the right of the decimal point (fractions). The class should now be able to see that a *decimal fraction* is one whose unexpressed denominator is either ten or some power of ten. Plenty of other examples should be given.

2. Decimals, Finite and Infinite.

(a) **To Convert a Decimal to a Vulgar Fraction.**—Before dealing with finite or infinite, or as they are sometimes called terminating and non-terminating decimals, it will be necessary to show the class how to convert a decimal to a vulgar fraction.

Take $69\cdot426$ as an example.

$$\begin{aligned} 69\cdot426 &= 69 + \frac{4}{10} + \frac{2}{100} + \frac{6}{1000} \\ &= 69 + \frac{426}{1000} = 69\frac{426}{1000} = \frac{69426}{1000}. \end{aligned}$$

After this and other examples have been worked and explained upon the B.B., the class might then be asked to state the rule:—

Write down the given number, omitting the decimal point, for the numerator, and for the denominator write unity (1) followed by as many cyphers as there are decimal places in the given number. If there be no integral portion apply the rule to the decimal portion only, and reduce to its lowest terms; e.g.—

Reduce $\cdot0685$ to a vulgar fraction.

$$\cdot0685 = \frac{6}{1000} + \frac{8}{10000} + \frac{8}{100000} + \frac{5}{1000000} = \frac{6855}{100000} = \frac{1371}{20000}.$$

The reverse process should then be shown, *i.e.*, to convert a vulgar fraction to a decimal, and the two processes should be compared.

(b) **Terminating and Non-terminating Decimals.**—Work a series of examples on the B.B., and let the class discover this for themselves. They will then find that it is not possible to express every vulgar fraction as a decimal. They will discover that a vulgar fraction must have 10 or some power or factor of 10 for its denominator before it can be exactly expressed by a decimal.

Take as examples $\frac{1}{10}$, $\frac{1}{11}$, $\frac{1}{7}$, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{5}{16}$.

$$\begin{array}{ll} \frac{1}{10} = \cdot4 & \frac{1}{11} = \cdot909090\ldots \\ \frac{1}{8} = \cdot125 & \frac{1}{7} = \cdot1428571428\ldots \\ \frac{3}{8} = \cdot375 & \frac{3}{7} = \cdot4285714285\ldots \\ \frac{5}{16} = \cdot3125 & \frac{5}{8} = \cdot625 \end{array}$$

Those to the left terminate; those to the right do not. Now ask the class to examine the denominators of all these fractions, by reducing them to their prime factors.

$$\begin{array}{ll} 10 = 5 \times 2 & 11 \text{ is a prime number} \\ 5 = 5 \times 1 & 9 = 3 \times 3 \\ 16 = 2 \times 2 \times 2 \times 2 & 7 = 7 \times 1 \end{array}$$

It will be observed that the denominators of all the fractions which give terminating decimals contain the factors 2 or 5 or both, and these are the factors of 10. The denominators of the fractions which give non-terminating decimals contain neither 2 nor 5 as factors; hence the rule:—

If the denominator of the given vulgar fraction in its lowest terms be a multiple of the factors 2 or 5 only, the fraction can be expressed as an exact or terminating decimal; otherwise it cannot.

But though a given vulgar fraction may not be exactly expressed as a decimal, nevertheless we can express it to any degree of accuracy we please short of absolute accuracy. The accuracy may be so great as to be sufficient for all practical purposes; *i.e.*, it may be *practically accurate*, although *theoretically inaccurate*.

Take $\frac{1}{8}$ as an example.

$$\begin{array}{llll} \frac{1}{8} \text{ is greater than } \cdot8 & \text{but less than } \cdot9; & \text{error less than } \frac{1}{80}. \\ \text{,,} & \cdot88 & \text{,,} & \cdot9; & \text{,,} & \frac{1}{800}. \\ \text{,,} & \cdot888 & \text{,,} & \cdot9; & \text{,,} & \frac{1}{8000}. \\ \text{,,} & \cdot888 & \text{,,} & \cdot9; & \text{,,} & \frac{1}{80000}. \end{array}$$

The error is thus seen to grow less and less, and by taking a proper number of figures in the decimal part, $\frac{1}{8}$ can be thus represented to any required degree of accuracy.

To Determine the Limit of the Number of Repeating Figures in a Non-terminating Decimal.—Take $\frac{1}{7}$ as an example to illustrate this.

The divisor is 7, and it will be observed that the number of figures recurring is 6, which is the limit, or greatest number possible for this

Reduce $\frac{2}{7}$ to a decimal

$$\begin{array}{r} 7 \overline{)600000} \\ \underline{49} \\ 11 \\ \underline{7} \\ 4 \\ \underline{28} \\ 12 \\ \underline{84} \\ 36 \\ \underline{28} \\ 8 \\ \underline{56} \\ 24 \\ \underline{14} \\ 10 \\ \underline{7} \\ 3 \end{array}$$

therefore, only 6 remainders possible, and, therefore, there cannot be more than 6 figures—there may be less—in the recurring period.

The teacher should give other examples to show that the recurring figures are not necessarily always one less in number than the divisor, e.g., $\frac{2}{3} = .\dot{6}$. Here the recurring figure is one only; with $\frac{1}{11}$, which $= .\dot{9}0\dot{9}$, the recurring figures are two; but in any case they can never be more than one less than the divisor.

To Change a Pure Circulating Decimal into a Vulgar Fraction.—The method is as follows:—

Change $.70\dot{1}$ to a vulgar fraction.

1. $.70\dot{1} \times 1000 = 701.\dot{7}0\dot{1} = 701 + .70\dot{1}$.

Why multiply by 1000? Because there are 3 decimal places, and the object is to convert them into whole numbers (integers). Let the class note that 1000 gives 3 cyphers for 3 decimal places.

10000 " 4 " " 4 " " and so on.

2. Now take $.70\dot{1}$ from each side and we get

$$.70\dot{1} \times 999 = 701.$$

3. Next divide each side by 999, and we then get $.70\dot{1} \frac{701}{999}$.

4. The class should then state the rule:—

The numerator of the vulgar fraction is the number formed by the digits in the recurring period; the denominator is the number formed by repeating the digit 9 as many times as there are digits in the circulating period.

To Convert an Impure Circulator into a Vulgar Fraction.

Convert $.4590\dot{6}$ into a vulgar fraction.

$$.4590\dot{6} \times 100000 = 45906.906906, \text{ etc.}$$

$$.4590\dot{6} \times 100 = 45.906906, \text{ etc.}$$

$$.4590\dot{6} \times 99900 = 45861.$$

$$\begin{array}{r} .4590\dot{6} \\ \underline{.45906} \\ 99900. \end{array}$$

There are four steps.

1. Multiply by 100000 to convert $.4590\dot{6}$ into whole numbers.

2. Multiply $.4590\dot{6}$ by 100 to convert the non-recrursers into whole numbers.

3. Then subtract both sides.

4. Then divide each side by 99900.

The pupils should then be able to give the rule:—

The numerator is formed by subtracting the non-recrursers from the whole quantity; the denominator is formed by writing 9 for every figure that recurs and a cypher for every figure that does not recur.

The Simple Rules.—It is not anticipated that the young teacher will now find any difficulty in explaining intelligently the simple rules of decimals to a class, especially in the case of addi-

tion and subtraction. Multiplication should be handled with equal ease, and in all three cases the proofs should be given by vulgar fractions. There are now a number of good arithmetics in the market, and any one of these will probably give all the assistance that may be required for the efficient teaching of these rules. A little more difficulty may be felt in the case of division; but even here the rule, however stated, always depends upon the same principle as that of ordinary simple division. The only difficulty is in fixing the position of the decimal point in the quotient; but whatever method of working is adopted, the teacher should make the class thoroughly grasp the fact that *there must always be as many decimal places in the divisor and quotient together as there are in the dividend alone.*

Applications of Proportion.—Many of the higher rules of arithmetic are really applications of proportion, and this is especially true of interest, percentages, averages, and stocks. A number of technical terms are of necessity introduced; but the principle of the work is more or less the same in all of them. These technicalities must be carefully introduced, well explained, and freely illustrated by commercial examples. No attempts should be made to “draw” or “educe” these terms. They are matters for instruction, rather than training. The solving of the examples themselves will afford plenty of opportunity for the educative side of the work, and the teacher will find his best results there. There is little difficulty in giving clear conceptions of such terms as interest, discount, amount, principal, rate (*i.e.*, rate per cent. per annum, unless otherwise stated), commission, brokerage, etc.; but there is always more difficulty in dealing with stocks, and the teacher must be prepared to devote plenty of time to this subject. This difficulty arises partly from the magnitude, or breadth rather, of the applications of stocks. The stock may be government stock, as distinct from commercial or business stock. To solve all cases dealing with government stock, a full and proper knowledge of bonds, the national debt, the public funds, annuities, loans, consols and such jargon as the 3 per cents, the 4 per cents, etc., is required. Then the capital of public companies like our great banks, chartered companies, railways, gas, mines, shipping, etc., which issue stock or raise their funds by the sale of stock requires some explanation. These are generally offered in shares, and are generally bought and sold through the agency of stockbrokers, who require a commission which they call brokerage. The stock may be at par, at a dis-

count, or at a premium, and so on. It will thus be seen that the child has to practically acquire a special vocabulary to understand the very terms in which his arithmetic problems are couched, before he can deal with the difficulties of the actual problems themselves. These names are often mere abstractions to the children for a time, and in the early stages it is advisable to substitute the names of concrete objects where possible to aid them to a clear conception of the process.

SQUARE ROOT.

Truths and Examples.

Teaching.

I. Explanation of Term.

- Numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
- Squares, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
- Numbers, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
- Square roots, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

A. Definitions and Truths.

1. The **Square** of a number is the product of the number multiplied by itself.
2. The **Square Root** of a given number is a number which, multiplied by itself, will produce the required number.
3. The square of the square root of a number is the number itself.
4. A number ending with 2, 3, 7, or 8 cannot be the square of any number.
5. The square of any number consists of twice as many figures, or twice as many, less one, as there are in the given number, e.g.—
 $20^2 = 20 \times 20 = 400$
 $81^2 = 81 \times 81 = 6561$
 $300^2 = 300 \times 300 = 90000$
 $910^2 = 910 \times 910 = 828100$.

B. The Symbol of Square Root.— $\sqrt{\text{or } \sqrt{\quad}}$.

Examples:—

$$\begin{aligned}\sqrt{4} &= 2; & \sqrt{9} &= 3; \\ \sqrt{16} &= 4; & \sqrt{25} &= 5.\end{aligned}$$

I. Place the integers from 1 to 10 on the B.B. Let the class multiply each number by itself, and place the products under the given numbers. The products are called **squares**.

Now illustrate by diagrams. For this purpose take the integers 3 and 4 and construct squares. Let the class count the

A		B	
	1	2	3
	4	5	6
	7	8	9
C		D	

E				H
	1	2	3	4
	5	6	7	8
	9	10	11	12
	13	14	15	16
F				G

number of small squares in each of the larger ones. They will notice that—

- (1) $3 \times 3 = 9$; $4 \times 4 = 16$.
- (2) $AB \times AC = ABDC$ (the square).

(3) That 9 is the square of 3.

(4) That 3 is the square root of 9.

Deal in same way with the square EFGH.

A. 1. The class should now work the examples given opposite, and others suggested by the teacher.

2. They should then be able to give the *definition of square and square root*.

3. They should have observed the truth contained in the third statement.

4. They should next have their attention called to the unit figure of each of the numbers called squares. They are 1, 4, 9, 6, 5, 0. The integers missing are 2, 3, 7, and 8; hence the truth of statement 4.

5. (a) Call attention to the numbers and squares on the B.B. The class *discovers* that the square of a number of one figure consists of either one figure or two figures.

(b) Affix a cypher to the integer 2: it becomes 20. Let class square 20×20 ; it equals 400. Then they should observe from this and other examples that if one cypher (0) is affixed to the number, two (00) must be

SQUARE ROOT—continued.

Truths and Examples.	Teaching.
<p>I. $\sqrt{\quad} = \sqrt[2]{\quad} = (\quad)^{\frac{1}{2}}$; e.g.—</p> <p>2. $\sqrt{\quad} = \sqrt[4]{\quad} = 4^{\frac{1}{2}}$.</p> <p>3. (a) $\sqrt{(256 - 16 + 64)}$ or (b) $\sqrt{256 - 16 + 64}$.</p> <p>II. Worked Examples.</p> <p>Find the square root of 529, 6241.</p> <p>III. Reasons for Process.</p> <p>I. $\sqrt{529} = 23$ $529 = 500 + 29$ $= 400 + 120 + 9$ $500 + 29 (20 + 3)$ 400</p> <p>$2 + 20 + 3 \left\{ \begin{array}{l} 100 + 29 \\ 120 + 9 \\ 120 + 9 \end{array} \right\}$ or</p> <p>2. $\begin{array}{r} 20 + 3 \\ 20 + 3 \\ \hline 20 \times 3 + 3^2 \\ 20^2 + 20 \times 3 \end{array}$</p> <p>$20^2 + 2 \times 20 \times 3 + 3^2$ $= 400 + 120 + 9$ $= 500 + 29.$</p> <p>3. Proposition.</p> <p><i>If from the square of a number we subtract the square of one part of it, the remainder is a product of two factors: one factor is twice that part increased by the other part, and the other factor is the other part.</i></p>	<p>affixed to the square (400). Hence the square of a number of 2 figures consists of 3 or 4 figures.</p> <p>(c) Similarly 2 cyphers (00) affixed to the number gives 4 cyphers (0000) to its square. Let the class verify this by trial. Hence the square of a number of 3 figures consists of either 5 or 6 figures. The class could now deduce the general truth of 5.</p> <p>B. 1. Tell the class that the root of a number is denoted by the symbol $\sqrt{\quad}$ placed before it, the nature of the root being explained by the placing of a small figure in the top part of the angle. The real sign will be $\sqrt[2]{\quad}$, but it is customary to omit the index figure.</p> <p>2. Show that it may also be represented by a fractional index; e.g. — $\sqrt[2]{4} = 4^{\frac{1}{2}}$.</p> <p>3. Tell the class that compound quantities— (a) May be represented by the root sign ($\sqrt{\quad}$) placed before a bracket containing the quantities; or (b) By a vinculum covering the quantities.</p> <p>II. The system of pointing and the method of working should now be explained on the B.B. The examples opposite, or similar ones, might be used for this purpose.</p> <p>III. 1. Decompose 529 on the B.B. :— (a) Into 500 + 29; (b) Into 400 + 120 + 9. Set the work out on the B.B. as in 1, and the class will see the elements of which the process is composed.</p> <p>2. Present the same truths conversely as in 2. Decompose 23 into (20 + 3), and multiply the decomposed number by itself. The product is seen to be equal to 529.</p> <p>3. Lead the class to see that the extraction of the square root depends upon the truth contained in proposition 3. Demonstrate as follows on the B.B. :— $(23)^2 = (20 + 3)(20 + 3).$ $= (20 \times 20) + (20 \times 3) + (3 \times 20) + (3 \times 3).$ $= 20^2 + 2 \times 20 \times 3 + 3^2.$ $= 20^2 + (2 \times 20 + 3) \times 3.$ $\therefore (23)^2 - (20)^2 = (2 \times 20 + 3) \times 3.$ <i>i.e., (23)² = 529</i> <i>and (20)² = 400</i></p> <p>Subtracting = 129 = (2 × 20 + 3) × 3.</p> <p>Examples. Plenty of carefully graded examples should now be given, commencing with easy numbers like 256. Every example will probably reveal some weakness or misapprehension somewhere in the class, and this must be met by further explanation. The cypher should be introduced when cypherless numbers are successfully handled.</p>

MENTAL ARITHMETIC.**I. Objects of Mental Arithmetic.**

1. To ensure **rapidity** and **accuracy** in arithmetic.
2. To develop **dexterity** in the manipulation of quantities.
3. To **train the mind** for the arithmetic of the next standard.
4. To **recapitulate** rapidly and frequently the work of the lower standards.
5. To form the **habit** of mental activity.

II. How to obtain these Objects.

1. Do not confine your questions to "scores" and "dozens," but give plenty of "tots" embracing practice in all the ordinary processes of arithmetic.
2. Let your examples be **varied**.
3. Let them deal both with the **abstract** and the **concrete**.
4. Give exercises in the **fractional parts** of money, and the commonest weights and measures.
5. Let the questions be **practical**. The dimensions of the schoolroom, the playground, and the desks. The weights of a few familiar objects should be accurately known and recorded, and occasionally referred to as standards of measurement.

III. Tots.—A footnote to Schedule I. in the Code requires the inspector to demand of scholars of the Fourth Standard and upwards the addition of columns of pounds, shillings, and pence within a specified time, in order to show readiness and accuracy. "Occasionally a long column of figures may be written in the sight of the scholars, and they may be required to name in quick succession the results of each addition as the inspector or teacher points to the several figures in any order. Oral practice should be given in all the ordinary processes of arithmetic, and it should be so varied as to furnish as many different forms of exercise as possible." It will thus be seen that a great deal of importance is attached to practice in such calculations as are now known as "tots," and for this purpose, where possible, it is best to use a *tot frame*. Where the teacher has to write every "tot," a large amount of time is unnecessarily expended; and so far as such things lie in the teacher's power, efforts should be made to avoid this. Nor should these exercises be postponed till the Fourth Standard; they should begin in the First, and might find a place in the higher classes of the infant school. The nature of the

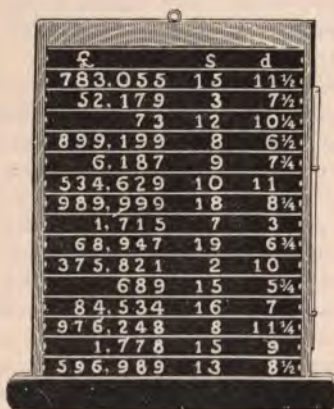
"tot" can be suited to the capacity and requirements of the children. Tot cards are published and may be used, but the tot frame is undoubtedly the best aid for this work.



1. Arnold's Revolving Tots.—This piece of apparatus consists of a revolving sheet of figures, which can be covered so far as is desired by a revolving curtain. Both sheet and curtain are worked by screws at the top right-hand corner of the frame. It is obvious that an immense variety of examples can be supplied by the proper regulation of the sheet and curtain, and that that ready practice desired can easily be obtained. The immense variety of combinations possible prevents the tots ever becoming "known," so that every fresh adjustment will always demand a fresh calculation.

2. The Oxford Tot Frame.—This tot frame is also specially suited to the requirements of the new Code. It consists of 16 reversible tablets, with figures on either side. The tablets are reversed very easily and very quickly, so that an infinite variety of examples can be supplied. The figures are painted white, and are $1\frac{1}{4}$ inches in size, so that it is suitable for work with large classes. It is specially designed to rest on any easel, and it contains a very good feature in its B. B. space at the bottom for the answer.

Provision is also made at the side for the keeping of a pointer, so that it is always ready to hand. A simpler frame is provided for younger classes, and a double frame for classes working in two sections. Answers may be obtained from the firm selling these for this frame, but not for the simpler one. The tots can be lengthened or shortened by simply pointing to their limit, 4, 5, 6, or 7 rows, as the case may be, and variety is obtained by reversing one or more tablets.



IV. Some Special Rules for Mental Arithmetic.

1. So much a Day, how much a Year.

(a) Learn following table:—

1d. per day	=	£1 10 5	per year.
$\frac{3}{4}$ d.	"	=	1 2 9 $\frac{3}{4}$ "
$\frac{1}{2}$ d.	"	=	0 15 2 $\frac{1}{2}$ "
$\frac{1}{4}$ d.	"	=	0 7 7 $\frac{1}{2}$ "

(b) Multiply the shillings and pence per day by 5, add 7s. 7½d. for every farthing, and then for every penny reckon £1½; e.g., 6s. 4½d. a day, how much a year?

$$\begin{array}{r}
 \text{1. Add } 15s. \ 2\frac{1}{2}d. \text{ for the } \frac{1}{2}d. \text{ per day} = \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 0 \quad 15 \quad 2\frac{1}{2} \end{array} \\
 \text{2. Multiply } 6s. \ 4d. \text{ by } 5 = \begin{array}{r} 1 \quad 11 \quad 8 \end{array} \\
 \text{3. Add } \text{£}1\frac{1}{2} \text{ for every penny (76d.)} = \begin{array}{r} 114 \quad 0 \quad 0 \end{array} \\
 \hline
 \text{£}116 \quad 6 \quad 10\frac{1}{2}
 \end{array}$$

2. To reduce cwts. qrs. lbs. to lbs.—Rule. To the number represented by the cwts. and lbs. add 12 times the number of cwts., and add 28 for every quarter, e.g. :—

Reduce 32 cwt. 2 qrs. 24 lbs. to lbs.

$$\begin{array}{r}
 \text{(a) Number represented by cwts. and lbs.} = 3224 \\
 \text{(b) Add 12 times the number of cwts (12} \times 32) = 384 \\
 \text{(c) Add } 2 \times 28 \text{ for 2 qrs.} = 56
 \end{array}$$

3664 lbs.

3. Interest at 5 per cent., e.g., £689 15s. 0d. at 5 per cent.

$$\begin{array}{r}
 \text{(a) Call the pounds shillings and divide by 20} = \text{£}34 \quad 9 \quad 0 \\
 \text{(b) 15s. is } \frac{3}{4} \text{ of } \text{£}1 \therefore \text{ call it } \frac{3}{4} \text{ of a shilling} = \begin{array}{r} 0 \quad 0 \quad 9 \end{array}
 \end{array}$$

£34 9 9

4. Interest at 2½ per cent.—Proceed as for 5 per cent., and divide your answer by 2.

5. Interest at 6½ per cent., e.g., £960 16s. 8d. at 6½ per cent.

Divide the amount by 16, because 6½ is ⅙ of 100.

$$\frac{\text{£}960 \ 16 \ 8}{16} = \text{£}60 \ 1 \ 0\frac{1}{2}$$

Rates which are easy factors of 100 can be similarly dealt with.

6. Interest for an Aliquot Part of a Year.—This will include such quantities as 73 days, 219 days, etc. Note that the days are generally some easy factor of 365. Proceed as in 5 per cent. or 4 per cent., or the stated percentage, and then divide by the required fraction; e.g. :—

£348 15s. 0d. for 73 days at 5 per cent.

$$\begin{array}{r}
 \text{(a) 348 shillings} \quad - \quad - \quad - = \text{£}17 \quad 8 \quad 0 \\
 \text{(b) 15s.} = \text{£}\frac{3}{4} \text{; call it } \frac{3}{4} \text{s.} \quad - \quad - = \begin{array}{r} 0 \quad 0 \quad 9 \end{array} \\
 \hline
 \text{(c) Add two together} \quad - \quad - = \text{£}17 \quad 8 \quad 9 \\
 \text{(d) Divide by } \frac{1}{\frac{73}{365}} \quad - \quad - = \text{£}3 \quad 9 \quad 9
 \end{array}$$

7. To find Interest at any Rate, e.g., £345 15s. 0d. at 4 per cent. Multiply by double the given rate, point off the last figure in the £'s, and call them shillings (i.e., all except the last figure).

$$\begin{array}{r}
 \text{(a) } \text{£}345 \ 15s. \ 0d. \times 8 \quad - \quad - \quad - \quad - \quad - = \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 2760 \quad 0 \quad 0 \end{array} \\
 \text{(b) Point off last figure of 2766} = 276s. \quad - \quad - = \begin{array}{r} 13 \quad 6 \quad 0 \end{array} \\
 \text{(c) The 6 pointed off is } \frac{6}{10} \text{s., which equals } 7\frac{1}{2}d. \\
 \text{(d) Adding (b), (c) we get } \text{£}13 \ 6s. \ 0d. + 7\frac{1}{2}d. = \text{£}13 \ 6s. \ 7\frac{1}{2}d.
 \end{array}$$

8. To find the Mean Proportional, e.g., as $3 : x :: x : 12$. Rule. Multiply extremes and take the square root.

$$3 \times 12 = 36$$

$$\sqrt{36} = 6$$

$$\text{Hence } 3 : 6 :: 6 : 12.$$

Again. Find the mean proportional of 363 and 243.

- (a) Factor the numbers 3×121 and 3×81 .
- (b) Rearrange in squares $121 \times 81 \times 9$ and multiply.
- (c) Take square roots $11 \times 9 \times 3$.
- (d) Multiply for product 297.

$$\text{Hence } 363 : 297 :: 297 : 343.$$

9. Practice.

(a) **Allquot Parts.**

1. 4864 articles at 12s. 6d. = £4864 $\times \frac{8}{10}$ (12s. 6d. being $\frac{8}{10}$ of £1).

$$\text{For convenience multiply by 2} = \frac{4864 \times 10}{16} = £3040.$$

i.e., Add a cypher and divide by 16.

2. For 2s. 7½d., e.g., 264 articles at 2s. 7½d.

$$2s. 7\frac{1}{2}d. = 2s. 6d. + 1\frac{1}{2}d.$$

$$2s. 6d. = £\frac{1}{2} \text{ and } 1\frac{1}{2}d. = \frac{1}{4}s.$$

$$\text{Hence } \frac{1}{2} \times £264 = £132 \text{ os. od.}$$

$$\text{And } \frac{1}{4} \times 264s. = £1 \text{ 13s. od.}$$

$$\underline{\underline{£34 \text{ 13s. od.}}}$$

3. For 9¾d. Divide the amount or number by 16, and call your answer shillings, then multiply by 13; e.g., 562 articles at 9¾d.

$$\text{Divide by 16} = 562 \div 16 = 35\frac{1}{2}s. = 35s. 1\frac{1}{2}d.$$

$$\text{And } 35s. 1\frac{1}{2}d. \times 13 = 456s. 7\frac{1}{2}d. = £22 \text{ 16s. } 7\frac{1}{2}d.$$

$$\text{Reason for process—} 9\frac{3}{4} = \frac{39}{4} = \frac{13 \times 3}{4} = 13 \times \frac{3}{4}$$

(b) **To Multiply by such Amounts as give easy Numerators or Denominators.**

Take £33 6s. 8d. \times 562 as an example.

$$£33 \text{ 6s. } 8d. = 33\frac{1}{2} = \frac{19}{2}$$

$$\therefore £33 \text{ 6s. } 8d. \times 562 = \frac{19}{2} \times 562 = \frac{19 \times 281}{1} = £1873 \text{ 6s. } 8d.$$

10. Decimals.—To reduce one amount to the decimal of another, e.g., Reduce 6s. 9d. to the decimal of £4 13s. 9d.

- (a) Find the factors of the smaller sum 6s. 9d. = 81d. = 9×9 .

(b) Divide the given sum by either of the factors (9×9) which is contained in it. (In this case both are.)

$$\text{Then } £4 \text{ 13s. } 9d. \div 9 = 10s. 5d.$$

- (c) Then the fraction becomes $\frac{9}{10s. 5d.} = \frac{1}{11\frac{1}{2}} = .072$.

It will be observed that a common factor (9) is cancelled out of each quantity, and the remaining factors 9 and 10s. 5d. constitute the fraction which is reduced to a decimal.

11. To Square Numbers.

(a) **To Square a Special Number.**—The numbers are just below or just above an exact number of hundreds, like 495 or 906.

$$(495)^2 = (495 + 5)(495 - 5) + 5^2.$$

$$= (500 \times 490) + 25 = 245025.$$

To those who know Algebra the reason for the rule is easily understood.

$$\text{For } x^2 - y^2 = (x + y)(x - y),$$

$$\text{Then } x^2 = (x + y)(x - y) + y^2.$$

Note that such a number is taken as will just raise or reduce the given number to an exact number of hundreds; *e.g.*, 5 is added and subtracted in the first case; whilst 6 is subtracted and added in the second case.

(b) **Having given a Number to find the Square of the next Highest Number.**—This may be otherwise expressed as finding the square of a number just above or just below an exact number of tens; *e.g.*, 41.

$$\text{Decomposing } 41 = (40 + 1),$$

$$\text{And } (41)^2 = (40 + 1)^2 = (40)^2 + 2 \cdot 40 \cdot 1 + 1^2$$

$$= 1600 + 80 + 1$$

$$= 1681$$

$$\text{Reason for rule } (x + 1)^2 = x^2 + 2x + 1$$

$$\text{And } (x - 1)^2 = x^2 - 2x + 1$$

(c) **To Square any Number mentally**, say 36.

1. Add the unit figure to the whole number; $36 + 6 = 42$.
2. Multiply the 42 by the tens figure (3); $42 \times 3 = 126$.
3. Add a cypher to the right (*i.e.*, multiply by 10); 1260.
4. Add the units figure squared (6^2); $1260 + 36 = 1296$.

12. **To find True Discount.**

- (a) At 5 % divide by 21; for $\frac{100}{21} = 21$.
- (b) " 4 " " 26; " $\frac{100}{26} = 26$.
- (c) " 10% " 11; " $\frac{100}{11} = 11$.
- (d) " $2\frac{1}{2}\%$ " 41; " $\frac{100}{41} = 41$.
- (e) " 1 % " 101; " $\frac{100}{1} = 101$, and so on.

Examples.

1. £350 7s. 10½d. due in 1 year at 5%.
Then £350 7s. 10½d. ÷ 21 = £16 13s. 8½d.
2. £433 14s. 3d. due in 1 year at 4%.
Then £433 14s. 3d. ÷ 26 = £16 13s. 7½d.

If for a certain Number of Years.—To find the fraction multiply the time (in years) by the rate. This gives the numerator. For a denominator add the numerator to 100.

Find True Discount on £4120 8s. 7d. due 9 months hence at 4 per cent.

$$\text{Rate} = \frac{4}{100} \times 4 = 3.$$

$$\text{Then the fraction is } \frac{3}{103}.$$

$$\text{And } £4120 \text{ 8s. 7d.} \times \frac{3}{103} = £40 \text{ 0s. 1d.} \times 3 = £120 \text{ 0s. 3d.}$$

V. Typical Problems for each Standard.

Standard I.

1. How many must be added to 42 to make 72?
2. A man is 6 feet high. How many inches is that?
3. A man spends 6s. in penny stamps. How many does he get?
4. Apples are 6 a penny. How many for a shilling?
5. Of what number is 36 the half?
6. Three 24's are the same as how many 8's?

Standard II.

1. A boy has 10s. How much will he have left after spending 6s. $11\frac{1}{2}d.$?
2. How many more tens are there in 130 than in 100?
3. I have 10s. 10d., and give 100 boys 1 penny each; how much money do I keep?
4. How many halfpenny oranges can be bought for 1s. $1\frac{1}{2}d.$?
5. To 50 add 8 six times over.
6. 5 lbs. of bacon at 11d. a lb.

Standard III.

1. How many lbs. of butter at 1s. 1d. per lb. can be bought for 26s.?
2. How many more are 11 eights than 7 twelves?
3. A milkman has $3\frac{1}{2}$ galls. of milk. How many half pints can he sell?
4. How many children could take away 7 each from 63?
5. The circumference of a wheel is 12 feet. How many times will it go round in a mile?
6. Eggs are 10 a shilling. How many for a guinea and a half?
7. A man was born in 1831. How old is he now?
8. 6d. an hour for 8 hours a day. For 6 days, how much?
9. A joint of meat weighs $9\frac{1}{2}$ lbs. What did it cost at 10d. a lb.?
10. Divisor 25; quotient 8; remainder 6. What is the dividend?

Standard IV.

1. Suppose tea at 2s. 8d. a lb. How many oz. could be bought for 10s.?
2. A man steps 2 feet. In how many steps will he walk a furlong and back again?
3. A servant girl gets £13 a year wages. How much is that a week?
4. A man drinks $\frac{1}{2}$ pint of beer at dinner and $\frac{1}{2}$ pint at supper. How long would it take him at that rate to empty a 9-gallon cask?
5. 6 telegraph wires extend 5 miles each. What is the wire worth at 1d. per yard?
6. A wall is 20 yds. by 6 feet. What will it cost to whitewash at $\frac{1}{2}d.$ a square foot?
7. A ton of coals costs 25s. What is that a cwt.?
8. Potatoes are 3 lbs. for 2d. How many lbs. can be bought for 5s.?
9. $64 + 29 - 12 \div 9$.

Standard V.

1. How many quarters are there in $3\frac{1}{2}$ wholes?
2. What part of a sovereign is 8s. 4d.?
3. What number is the same part of 50 as 5 is of 6?
4. I buy tea at 2s. a lb. What would $\frac{1}{2}$ of $\frac{3}{4}$ lb. cost?
5. Which is the greater, $\frac{8}{9}$ of 7 or $\frac{7}{9}$ of 5?
6. I buy a cart for £20. I want to gain 10 per cent. For what must I sell it in 15 days?
7. How many men in 10 days will do the same amount of work as 5 men in 15 days?
8. A man owes £150. He becomes bankrupt, and can only pay 2s. 6d. the £. How much money has he?

Standards VI. and VII.

1. How many times is $\frac{1}{4}$ contained in $3\frac{1}{4}$?
2. S. I. on £350 for 2 years at 5 per cent.
3. Express $\frac{105}{128}$ of $\frac{3}{4}$ as a vulgar fraction.
4. Reduce 25 threepenny pieces to the fraction of £2.
5. A man pays £800 for a house. The ground rent is £7; the lease is 8 years. What does the house cost him?
6. A man buys a bicycle for £18, and gets 20 per cent. discount for cash. What does he pay for it?
7. A man works on commission at $3\frac{1}{2}$ per cent. He receives £311. How much money does he collect?

EXAMINATION QUESTIONS.

1.—Explain fully, as to a class of beginners, the method of long division, and work out the following question so as to show the meaning and value of each figure in the answer: Divide £23782 10s. 6d. by 17.

2.—Describe the best system you know for teaching numeration and notation.

3.—Make four sums—two in direct and two in inverse proportion—and show how you would explain to a class the working of one of them.

4.—Write out four simple problems in arithmetic, such as would be suitable in the Fourth Standard, for testing the intelligence with which the scholars had learned the rules.

5.—The new Code requires an exercise in rapid addition. Make out a column of figures suited for this exercise, and say how you would best secure quickness and accuracy in performing it.

6.—Show by means of illustrations how you would explain to a class of scholars the reason of one of these processes:—

(a) Finding the common denominator of three or more fractions.

(b) Reducing miles to half inches.

7.—Say how you would explain to beginners the rule for subtraction, and illustrate your answer by this example: 806 - 527.

8.—Take the following sum in long division: £72185 13s. 2d. ÷ 163, and work it so as to show fully the value of each separate figure in the answer, and of each remainder.

9.—In giving lessons on counting to very young children, say what apparatus you would find useful, and how you would make such lessons effective if you had no apparatus.

10.—Give as many forms of mental exercise as you can contrive on the number 24.

11.—Explain what is the proper use of a ball frame or counting frame in teaching arithmetic. Suppose you had no such apparatus, explain how you might teach counting by any of the objects in the schoolroom.

12.—Notes of Lessons on multiplication of fractions, reduction of money, ratio, short division, multiplication of money, numeration and notation, long division, numeration, fractions, first lesson on practice, simple subtraction, rule of three by the method of unity.

13.—State how you would explain to a scholar in the Third Standard the value of the full remainder obtained in the division of 349 by 42, when the division is performed by the factors 6 and 7 respectively.

14.—Distinguish the teaching of the rule of three by the method of unity and by proportion, and compare their advantages.

15.—Write out a rule for converting a pure circulating decimal into a vulgar fraction, and work an easy example in such a way as to show the reason of the rule.

16.—Write out two or three problems in mental arithmetic requiring the application of three at least of the compound rules.

17.—Make and explain diagrams to illustrate the following:—

$$\frac{1}{2}(\frac{1}{3} - \frac{1}{4}) = \frac{1}{12}; (\frac{1}{3} - \frac{1}{4}) \div \frac{1}{3} = \frac{1}{4}.$$

18.—Work at full length an example in compound practice which will prove your process in this instance to be shorter than the ordinary method of compound multiplication.

19.—In teaching subtraction two methods are commonly employed, viz., of equal additions and of decomposition. State and explain the method which you have been accustomed to employ, and set down a graduated series of sums leading up to the easiest to the most difficult process in subtraction.

20.—What is the meaning of the term "compound rules"? Why are they so called?

21.—To what common uses may the avoirdupois, liquid, and square measure tables be applied? Give examples of such mental problems as you would employ in each of these tables for Fourth Standard children.

22.—Write down the rules for working mentally the following sums: prices of dozens, of scores, multiplying by 99, and dividing by 60.

23.—A class can multiply by numbers up to 9. What intermediate steps of reasoning and practice are needed that they may be able to multiply intelligently by such a number as 67? Give more difficult examples of each step.

24.—By what illustrations on the B.B. would you prove to children that—

$$\frac{3}{4} \text{ of } \frac{2}{3} = \frac{1}{2}; \text{ and } \frac{2}{3} - \frac{3}{4} = \frac{1}{12}?$$

25.—Name those tables of weights and measures that should be first taught to children. Justify your selection by the uses to which the selected tables are applied.

26.—Suggest some different methods for multiplying £3 11s. 9½d. by 99. Show which you consider to be the shortest or simplest way. Would you think it advisable to teach young children more than one method? Give your reasons.

27.—A class of infants understand the notation of numbers up to (but not including) 10. How would you proceed to teach them the notation of numbers between 10 and 20?

Say especially what illustrations you would use.

tion and subtraction. Multiplication should be handled with equal ease, and in all three cases the proofs should be given by vulgar fractions. There are now a number of good arithmetics in the market, and any one of these will probably give all the assistance that may be required for the efficient teaching of these rules. A little more difficulty may be felt in the case of division; but even here the rule, however stated, always depends upon the same principle as that of ordinary simple division. The only difficulty is in fixing the position of the decimal point in the quotient; but whatever method of working is adopted, the teacher should make the class thoroughly grasp the fact that *there must always be as many decimal places in the divisor and quotient together as there are in the dividend alone.*

Applications of Proportion.—Many of the higher rules of arithmetic are really applications of proportion, and this is especially true of interest, percentages, averages, and stocks. A number of technical terms are of necessity introduced; but the principle of the work is more or less the same in all of them. These technicalities must be carefully introduced, well explained, and freely illustrated by commercial examples. No attempts should be made to “draw” or “educate” these terms. They are matters for instruction, rather than training. The solving of the examples themselves will afford plenty of opportunity for the educative side of the work, and the teacher will find his best results there. There is little difficulty in giving clear conceptions of such terms as interest, discount, amount, principal, rate (*i.e.*, rate per cent. per annum, unless otherwise stated), commission, brokerage, etc.; but there is always more difficulty in dealing with stocks, and the teacher must be prepared to devote plenty of time to this subject. This difficulty arises partly from the magnitude, or breadth rather, of the applications of stocks. The stock may be government stock, as distinct from commercial or business stock. To solve all cases dealing with government stock, a full and proper knowledge of bonds, the national debt, the public funds, annuities, loans, consols and such jargon as the 3 per cents, the 4 per cents, etc., is required. Then the capital of public companies like our great banks, chartered companies, railways, gas, mines, shipping, etc., which issue stock or raise their funds by the sale of stock requires some explanation. These are generally offered in shares, and are generally bought and sold through the agency of stockbrokers, who require a commission which they call brokerage. The stock may be at par, at a dis-

count, or at a premium, and so on. It will thus be seen that the child has to practically acquire a special vocabulary to understand the very terms in which his arithmetic problems are couched, before he can deal with the difficulties of the actual problems themselves. These names are often mere abstractions to the children for a time, and in the early stages it is advisable to substitute the names of concrete objects where possible to aid them to a clear conception of the process.

SQUARE ROOT.

Truths and Examples.

Teaching.

I. Explanation of Term.

- Numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
- Squares, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
- Numbers, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
- Square roots, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

A. Definitions and Truths.

1. The **Square** of a number is the product of the number multiplied by itself.
2. The **Square Root** of a given number is a number which, multiplied by itself, will produce the required number.
3. The square of the square root of a number is the number itself.
4. A number ending with 2, 3, 7, or 8 cannot be the square of any number.
5. The square of any number consists of twice as many figures, or twice as many, less one, as there are in the given number, e.g.—

$$20^2 = 20 \times 20 = 400$$

$$81^2 = 81 \times 81 = 6561$$

$$300^2 = 300 \times 300 = 90000$$

$$910^2 = 910 \times 910 = 828100.$$

B. The Symbol of Square Root.—

$\sqrt{\quad}$ or $\sqrt{\quad}$.

Examples:—

$$\begin{aligned} \sqrt{4} &= 2; & \sqrt{9} &= 3; \\ \sqrt{16} &= 4; & \sqrt{25} &= 5. \end{aligned}$$

1. Place the integers from 1 to 10 on the B.B. Let the class multiply each number by itself, and place the products under the given numbers. The products are called **squares**.

Now illustrate by diagrams. For this purpose take the integers 3 and 4 and construct squares. Let the class count the

A **B**

1	2	3
4	5	6
7	8	9

C **D**

E **H**

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

F **G**

number of small squares in each of the larger ones. They will notice that—

- (1) $3 \times 3 = 9$; $4 \times 4 = 16$.
- (2) $AB \times AC = ABDC$ (the square).
- (3) That 9 is the square of 3.
- (4) That 3 is the square root of 9.

Deal in same way with the square EFGH.

A. 1. The class should now work the examples given opposite, and others suggested by the teacher.

2. They should then be able to give the *definition of square and square root*.

3. They should have observed the truth contained in the third statement.

4. They should next have their attention called to the unit figure of each of the numbers called squares. They are 1, 4, 9, 16, 25, 36, 49, 64, 81, 100. The integers missing are 2, 3, 7, and 8; hence the truth of statement 4.

5. (a) Call attention to the numbers and squares on the B.B. The class *discovers* that the *square of a number of one figure consists of either one figure or two figures*.

(b) Affix a cypher to the integer 2: it becomes 20. Let class square 20×20 ; it equals 400. Then they should observe from this and other examples that if one cypher (o) is affixed to the number, two (oo) must be

SQUARE ROOT—continued.

Truths and Examples.	Teaching.
<p>I. $\sqrt{\quad} = \sqrt[2]{\quad} = (\quad)^{\frac{1}{2}}$; e.g.—</p> <p>2. $\sqrt{\quad} = \sqrt[4]{\quad} = 4^{\frac{1}{2}}$.</p> <p>3. (a) $\sqrt{(256 - 16 + 64)}$ or (b) $\sqrt{256 - 16 + 64}$.</p> <p>II. Worked Examples.</p> <p>Find the square root of 529, 6241.</p> <p>III. Reasons for Process.</p> <p>I. $\sqrt{529} = 23$ $529 = 500 + 29$ $\quad = 400 + 120 + 9$ $\quad \quad 500 + 29 (20 + 3)$ $\quad \quad 400$</p> <p>$2 + 20 + 3 \left\{ \begin{array}{l} 100 + 29 \\ 120 + 9 \\ 120 + 9 \end{array} \right\}$ or</p> <p>2. $\begin{array}{r} 20 + 3 \\ 20 + 3 \\ \hline 20 \times 3 + 3^2 \\ 20^2 + 20 \times 3 \end{array}$</p> <p>$20^2 + 2 \times 20 \times 3 + 3^2$ $\quad = 400 + 120 + 9$ $\quad = 500 + 29.$</p> <p>3. Proposition.</p> <p><i>If from the square of a number we subtract the square of one part of it, the remainder is a product of two factors: one factor is twice that part increased by the other part, and the other factor is the other part.</i></p>	<p>affixed to the square (400). Hence the square of a number of 2 figures consists of 3 or 4 figures.</p> <p>(c) Similarly 2 cyphers (00) affixed to the number gives 4 cyphers (0000) to its square. Let the class verify this by trial. Hence the square of a number of 3 figures consists of either 5 or 6 figures. The class could now deduce the general truth of 5.</p> <p>B. 1. Tell the class that the root of a number is denoted by the symbol $\sqrt{\quad}$ placed before it, the nature of the root being explained by the placing of a small figure in the top part of the angle. The real sign will be $\sqrt[2]{\quad}$, but it is customary to omit the index figure.</p> <p>2. Show that it may also be represented by a fractional index; e.g. — $\sqrt[2]{4} = 4^{\frac{1}{2}}$</p> <p>3. Tell the class that compound quantities—</p> <p>(a) May be represented by the root sign ($\sqrt{\quad}$) placed before a bracket containing the quantities; or</p> <p>(b) By a <i>vinculum</i> covering the quantities.</p> <p>II. The system of pointing and the method of working should now be explained on the B.B. The examples opposite, or similar ones, might be used for this purpose.</p> <p>III. 1. Decompose 529 on the B.B. — (a) Into 500 + 29; (b) Into 400 + 120 + 9. Set the work out on the B.B. as in 1, and the class will see the elements of which the process is composed.</p> <p>2. Present the same truths conversely as in 2. Decompose 23 into (20 + 3), and multiply the decomposed number by itself. The product is seen to be equal to 529.</p> <p>3. Lead the class to see that the extraction of the square root depends upon the truth contained in proposition 3. Demonstrate as follows on the B.B. — $(23)^2 = (20 + 3) (20 + 3).$ $\quad = (20 \times 20) + (20 \times 3) +$ $\quad \quad (3 \times 20) + (3 \times 3).$ $\quad = 20^2 + 2 \times 20 \times 3 + 3^2.$ $\quad = 20^2 + (2 \times 20 + 3) \times 3.$ $\therefore (23)^2 - (20)^2 = (2 \times 20 + 3) \times 3.$ <i>i.e.,</i> $(23)^2 = 529$ and $(20)^2 = 400$</p> <p>Subtracting = $129 = (2 \times 20 + 3) \times 3.$</p> <p>Examples. Plenty of carefully graded examples should now be given, commencing with easy numbers like 256. Every example will probably reveal some weakness or misapprehension somewhere in the class, and this must be met by further explanation. The cypher should be introduced when cypherless numbers are successfully handled.</p>

MENTAL ARITHMETIC.**I. Objects of Mental Arithmetic.**

1. To ensure **rapidity** and **accuracy** in arithmetic.
2. To develop **dexterity** in the manipulation of quantities.
3. To **train the mind** for the arithmetic of the next standard.
4. To **recapitulate** rapidly and frequently the work of the lower standards.
5. To form the **habit** of mental activity.

II. How to obtain these Objects.

1. Do not confine your questions to "scores" and "dozens," but give plenty of "tots" embracing practice in all the ordinary processes of arithmetic.
2. Let your examples be **varied**.
3. Let them deal both with the **abstract** and the **concrete**.
4. Give exercises in the **fractional parts** of money, and the commonest weights and measures.
5. Let the questions be **practical**. The dimensions of the schoolroom, the playground, and the desks. The weights of a few familiar objects should be accurately known and recorded, and occasionally referred to as standards of measurement.

III. Tots.—A footnote to Schedule I. in the Code requires the inspector to demand of scholars of the Fourth Standard and upwards the addition of columns of pounds, shillings, and pence within a specified time, in order to show readiness and accuracy. "Occasionally a long column of figures may be written in the sight of the scholars, and they may be required to name in quick succession the results of each addition as the inspector or teacher points to the several figures in any order. Oral practice should be given in all the ordinary processes of arithmetic, and it should be so varied as to furnish as many different forms of exercise as possible." It will thus be seen that a great deal of importance is attached to practice in such calculations as are now known as "tots," and for this purpose, where possible, it is best to use a *tot frame*. Where the teacher has to write every "tot," a large amount of time is unnecessarily expended; and so far as such things lie in the teacher's power, efforts should be made to avoid this. Nor should these exercises be postponed till the Fourth Standard; they should begin in the First, and might find a place in the higher classes of the infant school. The nature of the

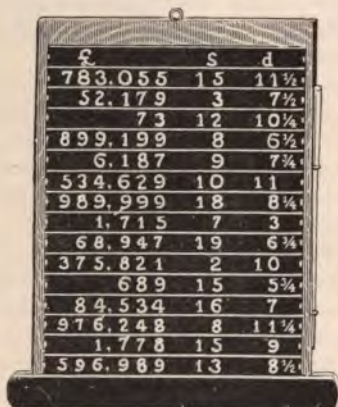
"tot" can be suited to the capacity and requirements of the children. Tot cards are published and may be used, but the tot frame is undoubtedly the best aid for this work.



1. Arnold's Revolving Tots.—This piece of apparatus consists of a revolving sheet of figures, which can be covered so far as is desired by a revolving curtain. Both sheet and curtain are worked by screws at the top right-hand corner of the frame. It is obvious that an immense variety of examples can be supplied by the proper regulation of the sheet and curtain, and that that ready practice desired can easily be obtained. The immense variety of combinations possible prevents the tots ever becoming "known," so that every fresh adjustment will always demand a fresh calculation.

2. The Oxford Tot Frame.—This tot frame is also specially suited to the requirements of the new Code. It consists of 16 reversible tablets, with figures on either side. The tablets are reversed very easily and very quickly, so that an infinite variety of examples can be supplied. The figures are painted white, and are 1¼ inches in size, so that it is suitable for work with large classes. It is specially designed to rest on any easel, and it contains a very good feature in its B.B. space at the bottom for the answer.

Provision is also made at the side for the keeping of a pointer, so that it is always ready to hand. A simpler frame is provided for younger classes, and a double frame for classes working in two sections. Answers may be obtained from the firm selling these for this frame, but not for the simpler one. The tots can be lengthened or shortened by simply pointing to their limit, 4, 5, 6, or 7 rows, as the case may be, and variety is obtained by reversing one or more tablets.



IV. Some Special Rules for Mental Arithmetic.

1. So much a Day, how much a Year.

(a) Learn following table:—

1d. per day	=	£1 10 5	per year.
½d.	"	=	1 2 9½ "
⅓d.	"	=	0 15 2½ "
¼d.	"	=	0 7 7¼ "

(b) Multiply the shillings and pence per day by 5, add 7s. 7½d. for every farthing, and then for every penny reckon £1½; e.g., 6s. 4½d. a day, how much a year?

$$\begin{array}{r}
 \text{1. Add } 15\text{s. } 2\frac{1}{2}\text{d. for the } \frac{1}{2}\text{d. per day} = \begin{array}{r} \text{£} \quad \text{s.} \\ \quad \text{0} \quad 15 \quad 2\frac{1}{2} \end{array} \\
 \text{2. Multiply } 6\text{s. } 4\text{d. by } 5 = \begin{array}{r} \quad \quad \text{1} \quad 11 \quad 8 \end{array} \\
 \text{3. Add } \text{£}1\frac{1}{2} \text{ for every penny (76d.)} = \begin{array}{r} \quad \quad \text{114} \quad 0 \quad 0 \end{array} \\
 \hline
 \text{£116} \quad 6 \quad 10\frac{1}{2}
 \end{array}$$

2. To reduce cwts. qrs. lbs. to lbs.—Rule. To the number represented by the cwts. and lbs. add 12 times the number of cwts., and add 28 for every quarter, e.g. :—

Reduce 32 cwt. 2 qrs. 24 lbs. to lbs.

$$\begin{array}{r}
 \text{(a) Number represented by cwts. and lbs.} = 3224 \\
 \text{(b) Add 12 times the number of cwts (12} \times 32) = 384 \\
 \text{(c) Add } 2 \times 28 \text{ for 2 qrs.} = 56 \\
 \hline
 3664 \text{ lbs.}
 \end{array}$$

3. Interest at 5 per cent., e.g., £689 15s. od. at 5 per cent.

$$\begin{array}{r}
 \text{(a) Call the pounds shillings and divide by 20} = \text{£34} \quad 9 \quad 0 \\
 \text{(b) 15s. is } \frac{3}{4} \text{ of £1} \therefore \text{ call it } \frac{3}{4} \text{ of a shilling} = \quad \quad 0 \quad 0 \quad 9 \\
 \hline
 \text{£34} \quad 9 \quad 9
 \end{array}$$

4. Interest at 2½ per cent.—Proceed as for 5 per cent., and divide your answer by 2.

5. Interest at 6½ per cent., e.g., £960 16s. 8d. at 6½ per cent.

Divide the amount by 16, because 6½ is ⅙ of 100.

$$\frac{\text{£960} \quad 16 \quad 8}{16} = \text{£60} \quad 1 \quad 0\frac{1}{2}.$$

Rates which are easy factors of 100 can be similarly dealt with.

6. Interest for an Aliquot Part of a Year.—This will include such quantities as 73 days, 219 days, etc. Note that the days are generally some easy factor of 365. Proceed as in 5 per cent. or 4 per cent., or the stated percentage, and then divide by the required fraction; e.g. :—

£348 15s. od. for 73 days at 5 per cent.

$$\begin{array}{r}
 \text{(a) 348 shillings} \quad - \quad - \quad - = \text{£17} \quad 8 \quad 0 \\
 \text{(b) 15s.} = \text{£}\frac{3}{4} \text{; call it } \frac{3}{4}\text{s.} \quad - \quad - \quad - = \quad \quad 0 \quad 0 \quad 9 \\
 \hline
 \text{(c) Add two together} \quad - \quad - \quad - = \text{£17} \quad 8 \quad 9 \\
 \hline
 \text{(d) Divide by } \frac{1}{8} (\frac{73}{365}) \quad - \quad - \quad - = \text{£3} \quad 9 \quad 9
 \end{array}$$

7. To find Interest at any Rate, e.g., £345 15s. od. at 4 per cent. Multiply by double the given rate, point off the last figure in the £'s, and call them shillings (i.e., all except the last figure).

$$\begin{array}{r}
 \text{(a) £345 15s. od.} \times 8 \quad - \quad - \quad - \quad - \quad - = \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 2760 \quad 0 \quad 0 \end{array} \\
 \text{(b) Point off last figure of 2766} = 276\text{s.} \quad - \quad - \quad - = \begin{array}{r} \quad \quad 13 \quad 6 \quad 0 \end{array} \\
 \text{(c) The 6 pointed off is } \frac{1}{10}\text{s., which equals } 7\frac{1}{2}\text{d.} \\
 \text{(d) Adding (b), (c) we get £13 6s. od.} + 7\frac{1}{2}\text{d.} = \text{£13 6s. } 7\frac{1}{2}\text{d.}
 \end{array}$$

8. To find the Mean Proportional, e.g., as $3 : x :: x : 12$. *Rule.* Multiply extremes and take the square root.

$$3 \times 12 = 36$$

$$\sqrt{36} = 6$$

$$\text{Hence } 3 : 6 :: 6 : 12.$$

Again. Find the mean proportional of 363 and 243.

(a) Factor the numbers 3×121 and 3×81 .

(b) Rearrange in squares $121 \times 81 \times 9$ and multiply.

(c) Take square roots $11 \times 9 \times 3$.

(d) Multiply for product 297.

$$\text{Hence } 363 : 297 :: 297 : 343.$$

9. Practice.

(a) **Alliquot Parts.**

1. 4864 articles at 12s. 6d. = £4864 $\times \frac{5}{8}$ (12s. 6d. being $\frac{5}{8}$ of £1).

$$\text{For convenience multiply by 2} = \frac{4864 \times 10}{16} = £3040.$$

i.e., Add a cypher and divide by 16.

2. For 2s. $7\frac{1}{2}$ d., e.g., 264 articles at 2s. $7\frac{1}{2}$ d.

$$2s. 7\frac{1}{2}d. = 2s. 6d. + 1\frac{1}{2}d.$$

$$2s. 6d. = £\frac{1}{8} \text{ and } 1\frac{1}{2}d. = \frac{1}{8}s.$$

$$\text{Hence } \frac{1}{8} \times £264 = £33 \text{ os. od.}$$

$$\text{And } \frac{1}{8} \times 264s. = £1 \text{ 13s. od.}$$

$$\underline{\underline{£34 \text{ 13s. od.}}}$$

3. For $9\frac{3}{4}$ d. Divide the amount or number by 16, and call your answer shillings, then multiply by 13; e.g., 562 articles at $9\frac{3}{4}$ d.

$$\text{Divide by 16} = 562 \div 16 = 35\frac{1}{8}s. = 35s. 1\frac{1}{8}d.$$

$$\text{And } 35s. 1\frac{1}{8}d. \times 13 = 456s. 7\frac{1}{8}d. = £22 \text{ 16s. } 7\frac{1}{8}d.$$

$$\text{Reason for process—} 9\frac{3}{4} = \frac{39}{4} = \frac{39}{16} \times 16 = \frac{13 \times 3}{16} \times 16.$$

(b) **To Multiply by such Amounts as give easy Numerators or Denominators.**

Take £33 6s. 8d. \times 562 as an example.

$$£33 \text{ 6s. 8d.} = 33\frac{1}{2} = \frac{19}{2}.$$

$$\therefore £33 \text{ 6s. 8d.} \times 562 = \frac{19}{2} \times 562 = \frac{19 \times 281}{1} = £18733 \text{ 6s. 8d.}$$

10. Decimals.—To reduce one amount to the decimal of another, e.g., Reduce 6s. 9d. to the decimal of £4 13s. 9d.

(a) Find the factors of the smaller sum 6s. 9d. = 81d. = 9×9 .

(b) Divide the given sum by either of the factors (9×9) which is contained in it. (In this case both are.)

$$\text{Then } £4 \text{ 13s. 9d.} \div 9 = 10s. 5d.$$

(c) Then the fraction becomes $\frac{9}{10s. 5d.} = \frac{9}{125} = .072$.

It will be observed that a common factor (9) is cancelled out of each quantity, and the remaining factors 9 and 10s. 5d. constitute the fraction which is reduced to a decimal.

11. To Square Numbers.

(a) **To Square a Special Number.**—The numbers are just below or just above an exact number of hundreds, like 495 or 906.

$$(495)^2 = (495 + 5)(495 - 5) + 5^2.$$

$$= (500 \times 490) + 25 = 245025.$$

To those who know Algebra the reason for the rule is easily understood.

$$\text{For } x^2 - y^2 = (x + y)(x - y),$$

$$\text{Then } x^2 = (x + y)(x - y) + y^2.$$

Note that such a number is taken as will just raise or reduce the given number to an exact number of hundreds; *e.g.*, 5 is added and subtracted in the first case; whilst 6 is subtracted and added in the second case.

(b) **Having given a Number to find the Square of the next Highest Number.**—This may be otherwise expressed as finding the square of a number just above or just below an exact number of tens; *e.g.*, 41.

$$\text{Decomposing } 41 = (40 + 1),$$

$$\text{And } (41)^2 = (40 + 1)^2 = (40)^2 + 2 \cdot 40 \cdot 1 + 1^2$$

$$= 1600 + 80 + 1$$

$$= 1681$$

$$\text{Reason for rule } (x + 1)^2 = x^2 + 2x + 1$$

$$\text{And } (x - 1)^2 = x^2 - 2x + 1$$

(c) **To Square any Number mentally**, say 36.

1. Add the unit figure to the whole number; $36 + 6 = 42$.
2. Multiply the 42 by the tens figure (3); $42 \times 3 = 126$.
3. Add a cypher to the right (*i.e.*, multiply by 10); 1260.
4. Add the units figure squared (6^2); $1260 + 36 = 1296$.

12. To find True Discount.

- (a) At 5 % divide by 21; for $\frac{100}{21} = 21$.
- (b) " 4 % " 26; " $\frac{100}{26} = 26$.
- (c) " 10 % " 11; " $\frac{100}{11} = 11$.
- (d) " $2\frac{1}{2}$ % " 41; " $\frac{100}{2\frac{1}{2}} = 41$.
- (e) " 1 % " 101; " $\frac{100}{1} = 101$, and so on.

Examples.

1. £350 7s. 10½d. due in 1 year at 5%.
Then £350 7s. 10½d. ÷ 21 = £16 13s. 8½d.
2. £433 14s. 3d. due in 1 year at 4%.
Then £433 14s. 3d. ÷ 26 = £16 13s. 7½d.

If for a certain Number of Years.—To find the fraction multiply the time (in years) by the rate. This gives the numerator. For a denominator add the numerator to 100.

Find True Discount on £4120 8s. 7d. due 9 months hence at 4 per cent.

$$\text{Rate} = \frac{4}{100} \times 4 = 3.$$

$$\text{Then the fraction is } \frac{3}{103}.$$

$$\text{And } £4120 \text{ 8s. 7d.} \times \frac{3}{103} = £40 \text{ os. 1d.} \times 3 = £120 \text{ os. 3d.}$$

V. Typical Problems for each Standard.

Standard I.

1. How many must be added to 42 to make 72?
2. A man is 6 feet high. How many inches is that?
3. A man spends 6s. in penny stamps. How many does he get?
4. Apples are 6 a penny. How many for a shilling?
5. Of what number is 36 the half?
6. Three 24's are the same as how many 8's?

Standard II.

1. A boy has 10s. How much will he have left after spending 6s. 11½d. ?
2. How many more tens are there in 130 than in 100 ?
3. I have 10s. 10d., and give 100 boys 1 penny each ; how much money do I keep ?
4. How many halfpenny oranges can be bought for 1s. 1½d. ?
5. To 50 add 8 six times over.
6. 5 lbs. of bacon at 11d. a lb.

Standard III.

1. How many lbs. of butter at 1s. 1d. per lb. can be bought for 26s. ?
2. How many more are 11 eights than 7 twelves ?
3. A milkman has 3½ galls. of milk. How many half pints can he sell ?
4. How many children could take away 7 each from 63 ?
5. The circumference of a wheel is 12 feet. How many times will it go round in a mile ?
6. Eggs are 10 a shilling. How many for a guinea and a half ?
7. A man was born in 1831. How old is he now ?
8. 6d. an hour for 8 hours a day. For 6 days, how much ?
9. A joint of meat weighs 9½ lbs. What did it cost at 10d. a lb. ?
10. Divisor 25 ; quotient 8 ; remainder 6. What is the dividend ?

Standard IV.

1. Suppose tea at 2s. 8d. a lb. How many oz. could be bought for 10s. ?
2. A man steps 2 feet. In how many steps will he walk a furlong and back again ?
3. A servant girl gets £13 a year wages. How much is that a week ?
4. A man drinks ½ pint of beer at dinner and ½ pint at supper. How long would it take him at that rate to empty a 9-gallon cask ?
5. 6 telegraph wires extend 5 miles each. What is the wire worth at 1d. per yard ?
6. A wall is 20 yds. by 6 feet. What will it cost to whitewash at ½d. a square foot ?
7. A ton of coals costs 25s. What is that a cwt. ?
8. Potatoes are 3 lbs. for 2d. How many lbs. can be bought for 5s. ?
9. $64 + 29 - 12 \div 9$.

Standard V.

1. How many quarters are there in 3½ wholes ?
2. What part of a sovereign is 8s. 4d. ?
3. What number is the same part of 50 as 5 is of 6 ?
4. I buy tea at 2s. a lb. What would ½ of ¾ lb. cost ?
5. Which is the greater, ⅔ of 7 or ⅔ of 5 ?
6. I buy a cart for £20. I want to gain 10 per cent. For what must I sell it ?
7. How many men in 10 days will do the same amount of work as 5 men in 15 days ?
8. A man owes £150. He becomes bankrupt, and can only pay 2s. 6d. in the £. How much money has he ?

Standards VI. and VII.

1. How many times is ⅔ contained in 3½ ?
2. S. I. on £350 for 2 years at 5 per cent.
3. Express .05 of ⅔ as a vulgar fraction.
4. Reduce 25 threepenny pieces to the fraction of £2.
5. A man pays £800 for a house. The ground rent is £7 ; the lease is 80 years. What does the house cost him ?
6. A man buys a bicycle for £18, and gets 20 per cent. discount for cash. What does he pay for it ?
7. A man works on commission at 3½ per cent. He receives £31½. How much money does he collect ?

EXAMINATION QUESTIONS.

- 1.—Explain fully, as to a class of beginners, the method of long division, and work out the following question so as to show the meaning and value of each figure in the answer: Divide £23782 10s. 6d. by 17.
- 2.—Describe the best system you know for teaching numeration and notation.
- 3.—Make four sums—two in direct and two in inverse proportion—and show how you would explain to a class the working of one of them.
- 4.—Write out four simple problems in arithmetic, such as would be suitable in the Fourth Standard, for testing the intelligence with which the scholars had learned the rules.
- 5.—The new Code requires an exercise in rapid addition. Make out a column of figures suited for this exercise, and say how you would best secure quickness and accuracy in performing it.
- 6.—Show by means of illustrations how you would explain to a class of scholars the reason of one of these processes:—
 - (a) Finding the common denominator of three or more fractions.
 - (b) Reducing miles to half inches.
- 7.—Say how you would explain to beginners the rule for subtraction, and illustrate your answer by this example: 806 - 527.
- 8.—Take the following sum in long division: £72185 13s. 2d. ÷ 163, and work it so as to show fully the value of each separate figure in the answer, and of each remainder.
- 9.—In giving lessons on counting to very young children, say what apparatus you would find useful, and how you would make such lessons effective if you had no apparatus.
- 10.—Give as many forms of mental exercise as you can contrive on the number 24.
- 11.—Explain what is the proper use of a ball frame or counting frame in teaching arithmetic. Suppose you had no such apparatus, explain how you might teach counting by any of the objects in the schoolroom.
- 12.—*Notes of Lessons* on multiplication of fractions, reduction of money, ratio, short division, multiplication of money, numeration and notation, long division, numeration, fractions, first lesson on practice, simple subtraction, rule of three by the method of unity.
- 13.—State how you would explain to a scholar in the Third Standard the value of the full remainder obtained in the division of 349 by 42, when the division is performed by the factors 6 and 7 respectively.
- 14.—Distinguish the teaching of the rule of three by the method of unity and by proportion, and compare their advantages.
- 15.—Write out a rule for converting a pure circulating decimal into a vulgar fraction, and work an easy example in such a way as to show the reason of the rule.
- 16.—Write out two or three problems in mental arithmetic requiring the application of three at least of the compound rules.
- 17.—Make and explain diagrams to illustrate the following:—

$$\frac{1}{2}(\frac{1}{3} - \frac{1}{4}) = \frac{1}{24}; (\frac{1}{3} - \frac{1}{4}) \div \frac{1}{2} = \frac{1}{12}.$$
- 18.—Work at full length an example in compound practice which will prove your process in this instance to be shorter than the ordinary method of compound multiplication.
- 19.—In teaching subtraction two methods are commonly employed, *viz.*, of equal additions and of decomposition. State and explain the method which you have been accustomed to employ, and set down a graduated series of sums leading up from the easiest to the most difficult process in subtraction.
- 20.—What is the meaning of the term "compound rules"? Why are they so called?
- 21.—To what common uses may the avoirdupois, liquid, and square measure tables be applied? Give examples of such mental problems as you would employ in each of these tables for Fourth Standard children.
- 22.—Write down the rules for working mentally the following sums: prices of dozens, of scores, multiplying by 99, and dividing by 60.
- 23.—A class can multiply by numbers up to 9. What intermediate steps of reasoning and practice are needed that they may be able to multiply intelligently by such a number as 67? Give more difficult examples of each step.
- 24.—By what illustrations on the B.B. would you prove to children that—

$$\frac{3}{4} \text{ of } \frac{7}{8} = \frac{21}{32}; \text{ and } \frac{7}{8} - \frac{3}{4} = \frac{1}{8}?$$
- 25.—Name those tables of weights and measures that should be first taught to children. Justify your selection by the uses to which the selected tables are applied.
- 26.—Suggest some different methods for multiplying £3 11s. 9d. by 99. Show which you consider to be the shortest or simplest way. Would you think it advisable to teach young children more than one method? Give your reasons.
- 27.—A class of infants understand the notation of numbers up to (but not including) 10. How would you proceed to teach them the notation of numbers between 10 and 20? Say especially what illustrations you would use.

28.—In learning the multiplication table, which products do children commonly find most difficulty in committing to memory? Account for some of the most difficult cases.

29.—What immediate steps are needed in leading a class which can multiply by 7 to multiplication by 777?

30.—How would you commence teaching arithmetic in an infant school, and how far do you think children under seven may be expected to go in learning arithmetic?

31.—Give some examples of suitable exercises in mental arithmetic adapted for scholars of the First and Fifth Standards respectively.

32.—Of the two methods of explaining subtraction—(1) equal additions; (2) decomposition—which do you prefer, and why? Illustrate your answer by an example fully worked out.

33.—Make four sums such as would be properly suited to test the proficiency of a scholar in the Fifth Standard; and give a few examples also of the sort of questions in mental arithmetic which such a scholar should be able to answer.

34.—What objects should be kept in view in the teaching of mental arithmetic? Say how these objects may be best attained, and give some examples of good oral exercises suitable to the Second Standard.

35.—Show how you would explain to a class of beginners the *reason* of any one of the following processes in arithmetic: (a) ascending reduction; (b) subtraction of fractions; (c) cancelling.

36.—Multiply 74086 by 900, and explain, as to a class, the process of working, and the separate value of each line of figures.

37.—State and explain, as to a class, the rule for the multiplication of a whole number by a fraction.

38.—Describe some varied exercises in mental arithmetic suitable for scholars either—

(a) In an Infant Class; or

(b) In the Fourth Standard.

39.—What useful purpose is served by analysing a sum in arithmetic, and showing the separate value of each figure? Illustrate your answer by working the following question in long division:—

$$537682 \div 37.$$

40.—Explain, as to a class of scholars, the rule for cancelling in either fractions or proportion, and give some examples.

41.—Name some of the most effective visible and tangible illustrations for use in teaching either (a) *Notation*, or (b) *Practice*.

42.—Make some mental exercises on money suited for the First and Second Standards, and let them be as varied in form as possible.

43.—Explain how you would make young children familiar with the right use and value of the figures 1 to 7 as the notation for 17.

44.—What are the shortest processes of working mentally the following sums: 57×25 ; 3 doz. articles at 7 $\frac{1}{2}$ d. each; 85×99 ?

45.—Describe your method of teaching infants between six and seven years of age to carry in addition, and say by what sort of visible illustration you could be helped to make the rule intelligible to such a class.

46.—Give examples of questions in mental arithmetic, suited to children of the Third Standard, which shall illustrate all the rules taught to children of that Standard, and shall prepare them for the work of the Fourth.

47.—Show by what sort of visible objects and illustrations you could make the rule for the addition of fractions intelligible to a class of beginners.

48.—Give some examples of exercises in mental arithmetic suitable for the highest class in a school, and show by what means rapidity and accuracy can be best secured in conducting such exercises.

49.—Give some hints for making oral exercises in arithmetic interesting.

50.—Explain any way you know of making clear to the eye the process called multiplying $\frac{3}{4}$ by $\frac{1}{2}$.

51.—Take the number 30 and say how many forms of mental exercise you could devise with that number for a class of children in Standard I., so as to give them some early acquaintance with concrete and fractional, as well as simple arithmetic.

52.—Frame three sets of arithmetical questions suited for scholars in the Fourth Standard, so as to test knowledge of the reasons of rules as well as the power of applying them.

53.—Say what sort of pictorial or other visible illustration you would use in teaching the elements of arithmetic to very young children, and show what use you would make of such illustration.

CHAPTER IX.

READING.

Its Value.

No branch of school education is more valuable than reading, and none is more important. Its uses and applications are so numerous and far-reaching that its value becomes self-evident. Nearly every branch of school work is affected by it, and education goes on by means of it as long as life lasts. It is a great aid to mental and moral culture; it records and lays bare the progress of the world, and it is the great enemy of ignorance and superstition, which often are the forerunners of sin and suffering. It adds immensely to the pleasures of mankind, and may be made a healthy form of mental recreation. Books are largely the vehicles for information, and now-a-days without our newspapers we are "out of the world". Bacon says that where there is little reading there is need for much cunning; the former is within the reach of all now, the latter is the attribute of the few. The ability to read also prepares us for our great field of literature, with all its attendant advantages. The mind, like the body, needs exercise, and some of the most suitable and enjoyable forms of mental exercise are to be found in reading.

General Principles.

The teacher must remember the nature and extreme difficulty of the work he is attempting; and there are certain broad principles or general rules, the remembrance and application of which will tend to minimise these difficulties. There is no royal road to reading, but there are certain well-formed tracks along which the way is shorter and the work easier.

1. Nature of the Acquisition.—Reading is a triple task; there are the idea in the mind, the spoken words, and the symbols representing those words. That is, there are the idea, the sound, and the symbol. If the idea is translated by sounds we get spoken language; if by written or printed symbols, we get reading. The first combination is already formed when children enter school,

for they have within certain limits learned to express their ideas by sounds (words). The teacher's work is to form the combination between the words and the symbols, *i.e.*, between the sounds and the characters which represent them. This is a long and difficult task, requiring skill, method, and patience, which the teacher must always be prepared to give.

2. The Sequence in Teaching.—As in all other subjects of instruction the sequence in teaching must be observed. The teacher must proceed from the *known to the unknown*, and from the *simple to the complex*.

- (a) *From the Known to the Unknown.* A beginning must be made with words, and not with letters. Children already know many words as sounds and the meanings attached to them, as their use of them shows; but probably they know little or nothing of letters, hence to begin any system of reading with letters is to violate one of the cardinal principles of all teaching. It is the violation of this principle that constitutes one of the great blots in the synthetic methods (alphabetic and phonic methods).
- (b) *From the Simple to the Complex.* This is specially important, but it seems in some measure to conflict with the preceding principle as far as reading is concerned. If we always started with the known we should have to begin with the most familiar or the oft-recurring words. But these are generally the words of most irregular notation, and therefore, in one respect at least, the most complex to children. Several times it is pointed out in this chapter that our system of spelling is most anomalous and defective, and the introduction of these anomalies at this early stage would give a series of shocks to the child, and destroy its confidence. So far as possible, its faith in law and regularity must be maintained; but if reading is to proceed from the known to the unknown, these anomalous words must soon be presented to the child with their attendant difficulties. It is wise to point out this difficulty, but it is largely dependent on the method used, as will be subsequently seen. So long as the Look-and-Say (analytic) method is used, it is absent or minimised; and it only makes its appearance to any appreciable degree with the introduction of the synthetic methods; and the lesson to be learned is not to be too anxious to introduce the synthetic method to any great degree in the early lessons on reading. Even when it *is* introduced, there are plenty of short, easy words of regular notation which lend themselves to synthetic treatment.
- (c) *The Artistic Element.* There is yet another reason why reading should begin with words rather than letters. Written or printed words are forms, and form, which is a matter for the eye, should be mastered as a whole. The parts may give no idea of the whole; the whole may give ideas of the parts.

3. Interest.—The teacher must study to maintain *interest*; and to do this he must seek to create a love for the subject. The *subject matter* of the lessons must be suitable, and intrinsically interesting. (For further information under this head the student is referred to the sections on Reading Books and Fairy Tales.) The *teacher's manner* must be pleasant and winning, his *methods* must be sound and scientific, based upon knowledge of child life and child mind. The lessons must be *graduated*, and a skilful use should be made of those useful aids, *comparison* and *contrast*. As soon as possible the scholars' assistance in the *detection* and *correction* of errors should be enlisted, and they should be made to feel that they are sharing the work and responsibility with the teacher. *Explanations* should be introduced in a suitable manner, and at suitable times, and there should be no *interruptions* or distractions either physical or mental. There should be no glare of light, no noise, no uncomfortable seats; nor should ill-placed spelling or explanation be given by the teacher, nor bad discipline tolerated from the class.

4. Assistance.—The amount of assistance rendered should vary. In the

earlier lessons much help will be required, for in school work *teaching should precede learning*. The B.B. can be freely used, words can be classified and syllabified, plenty of pattern work can be given for imitation, and writing can be made to assist. But as the scholars become older more work should then be thrown upon them. Help will still be required, but it will be for other aspects of the subject, so as to produce expressive reading.

5. Correction.—When giving the class practice in reading the teacher should listen with *closed book*. He will thus be in a better position to correct *all* kinds of errors, whether of word saying, of articulation, enunciation, or expression. Good reading places the listener in as good a position as the reader, and unless the teacher feels himself to be in that position, he knows that there is something needing correction. These corrections should always be made in a nice way, or there may be set up an unpleasant association which will handicap all subsequent efforts in these lessons.

6. Amount.—The amount attempted must always depend upon such factors as the following :—

- (a) The nature and extent of *local provincialisms*.
- (b) The *intelligence* of the children, and the extent of the *curriculum*. These should be interdependent. In a "slum" school or in a village school the same amount can hardly be expected as in the more favoured districts.
- (c) The *length of time* the children stay at school, and the degree of *regularity* attained.
- (d) The amount and quality of the *staff*.

There will always be favoured children, with special aptitude for reading. This fact is within the experience of every teacher. But the gifted must not be chosen as a standard for the others. The average ability and the average opportunities of the class should be gauged, and the quantity of the work should be apportioned accordingly. A little well done is better than a dabbling with much.

Age to Commence the Teaching of Reading.

There is a general opinion among experts that no instruction should be attempted in the elements of reading, writing, and arithmetic until the age of five; and this fact receives official sanction, for children are not *compelled* to attend school before that age. But this opinion is not shared by many of the ablest infant school teachers in the country. "On the contrary, it is often found in practice that piecing little words and sentences together with a movable or picture alphabet, imitating the forms of letters and figures with paper patterns or pencils, and counting the objects around them are occupations not more laborious, and certainly not less interesting, than many of the exercises of the kindergarten. Moreover, it is found that by the judicious admixture of exercises on simple words and on numbers, with other infantine employments, little children frequently overcome some of the earlier difficulties of reading and writing almost unconsciously, and before they are aware that they are difficulties. . . . Having regard to the short period of school life among the children of the labouring class, and to the indispensable importance of the three elementary subjects, it must always be held to be part

of the office of the preparatory or infant class to provide the rudiments of instruction in these subjects."

Infant Reading and its Difficulties.

I. Work of the Infant Stage.—This should be threefold:—

1. To teach the letters and their powers.
2. To teach the combination of the letters into small or easy words.
3. To teach the combination of little words into simple sentences.

II. Difficulties.

1. Physical.—These fall easily under four heads.

- (a) *Distinct Articulation.* The vocal organs of young children are sometimes but poorly developed, and others are defective. The distinct articulation necessary for pure pronunciation is the result of careful culture and growth. The *imitative faculty* must be freely used. The shape of the mouth and the position of the tongue should be frequently shown, and much patience should be exercised towards the dull and stupid. Common errors should be met with *systematic vocal drill*, and *exercises* should be formed by the teacher for class practice. These should take the form of short sentences; e.g.—

Vocal Difficulty.

Exercises.

th: The mother and father went with them.

r: He rode round the broad road on a brown horse.

- (b) *Voice Modulation.* Too often the reading of young children is a series of jerky monotonies. There is no cadence of voice to indicate the sense of the passage. This can only be met by plenty of *pattern work* and by *imitation*. A little explanatory conversation on the subject matter of the lesson may sometimes add intelligence to the reading, which may show itself in an improved vocal delivery, but, as a rule, the other methods will have to be relied on.
- (c) *Weak Attention.* The power of concentration is very small in children. Sustained attention is physically exhausting, so that only reasonable demands should be made upon them. Concentration is a slow growth; hence there should be *short lessons* and *suitable changes*. *Interest* is a great factor in attention, and the teacher must seek all legitimate devices to arouse and maintain it. By-and-by *habit* begins to assert itself, and attention follows as a matter of *custom* and *association*.
- (d) *Constitutional Difficulties.* There may be a weak constitution, a timid nature, bashfulness, shyness, all of which may result from physical causes. Laziness may be another result.

2. Mental.

- (a) *Association.* There is a threefold association to set up (see General Principles). This association requires time and some ingenuity to do it intelligently.
- (b) *Intelligence.* Intelligent reading should be expected of children. They read childish books dealing with the common experiences and incidents of child life, and therefore their reading ought to indicate understanding of the subject matter. The words require grouping or phrasing according to the sense; i.e., *the reading should be notional*. It is a difficulty which receives increasing attention as the difficulty attached to word-naming (recognising and saying the words) grows less. It is ignored in the earliest lessons. In the later lessons it is of primary importance, and practically monopolises the teacher's attention.

(c) *Defective Alphabet.* Most childish difficulties arise from this source. There are 42 elementary sounds in our language, and only 26 letters to express them. Furthermore, some of these letters are redundant, some are silent, and some sounds are represented in several ways. A child having learned *go, no, and so* is staggered to find the *o* different in *to* and *do*. There is a breach of expectation, a shock to childish confidence, which breeds timidity and distrust of all future phonetic attempts.

3. Moral.—A child may be wilfully inattentive, through some fault of temper like obstinacy or sullenness; or from laziness, and laziness in healthy people is not far removed from imperfect morality.

To Teach the Alphabet.

Whatever method of teaching is adopted, the alphabet will have to be learned sooner or later, but do not begin with it. Begin with small words, as already instructed, and for the reasons already given. If the teacher wishes to concentrate the work, he could adopt some such system as "Livesey's Object and Word Method". Eight common objects, or pictures of them, could be shown, the words printed on the B.B., or some other apparatus like the word-building frame could be used, and these words could be dealt with until all the letters are known. The words given are *can, box, jug, fez, drum, quill, whip, and key*, but the teacher could form other words for himself if necessary.

I. Apparatus Required.—Some or all of the following should be used :—

- (a) B.B., chalk and duster.
- (b) Cards of letters; one capital, and one small.
- (c) Kindergarten sticks.
- (d) Picture letters.
- (e) Word-building frames and solid letters.
- (f) Slates suitably ruled, and pencils for drawing the letters.

II. Capital Letters.—These should be taught first, and this may be done in several ways.

1. By Simple Recognition.

- (a) *In their order.* This is the worst method.
- (b) *By grouping according to their elements.* This may be a good method for teaching the *writing* of the letters, but it has no special claims for reading.

2. By Memory Aids.

—These will include :—

- (a) *Picture cards; e.g., A is the archer, etc.* This is the principle of *association*.
- (b) *Kindergarten sticks.* This is slow, but sure and interesting.
- (c) *Letter box or word-building frame.* The principle is the same in either case, and the teaching should arouse curiosity and maintain interest.
- (d) The *B.B.* may be used alone, or in conjunction with one or more of the other aids. The letters should be printed one at a time on the B.B.

III. Plan of Lesson.

1. Take a group of easily constructed letters—I, X, V, T, L, H, etc.
2. The letter I should be taken first as the simplest and easiest. Print it on the B.B. Name it. The children must repeat the name whilst looking at it.
3. Next take the *card of capital letters*. Class to point out the I.
4. Then let the children pick it out from the *box of letters*.
5. The same letter might then be picked out from the *picture cards*.
6. Now let all the children make an I with *kindergarten stick*.
7. Take another letter (T) and proceed in same way.
8. The two letters can then be formed into a word, IT.
9. The remaining letters could be taught in same way, and where possible *little words* should be formed and learned.
10. Later on the children should *write the letters on their slates*—
 - (a) From a copy.
 - (b) From dictation.

IV. Small Letters.

1. Teach those first which are *most like the capitals*; e.g., c, o, x, z, y, w, s, b, d; p, q; m, n, u, v.
2. Group those likely to be *confused* and *compare* and *contrast* them; e.g.,
3. When the small letters have been learned, place them side by side with the large ones, and let the children *compare* and *contrast* them. Then *mix* them and let the class name them picked out at random.

Classification of Letters.

1. **Capitals.**—In classifying the capital letters for the purpose of teaching the alphabet the teacher must remember that *sight* is to be studied more than sound, as reading is a matter for the eye. *So far as possible, the groupings should have some common element*, for in comparing letters *points of similarity* are more important than *points of difference*. Hence the *form* of the letters should be the basis of classification adopted.

Class 1. Common element, *straight line*, I, L, T, H, F, E.

„ 2. „ elements, *straight and oblique lines*, A, V, W, X, Z, N, M, K, Y.

„ 3. „ element, *curve*, C, G, O, Q, D, U, S, J.

„ 4. „ element, *curve and straight line*, P, B, R.

2. **Small Letters.**—These do not lend themselves so readily to classification by form. Nevertheless it is the proper and best classification for the reasons given above.

Class 1. Common element, *right line*, l, i, t.

„ 2. „ oblique line, v, w, k, y, z.

„ 3. „ right line with hook, m, n, u, r, h, f, j.

„ 4. „ curve, c, e, x, o, g, a, s.

„ 5. „ right line with curve, b, d, q, p.

First Lessons after the Alphabet.

Object.—The object is to *teach the powers of the consonants and words of two letters*. It is assumed that the class knows the alphabet and the powers of the vowels.

Apparatus.—B.B., chalk and duster; card with words of two letters; letter box and kindergarten sticks.

Lesson.

1. Print a vowel (say A) on the B.B. Class to name it.
2. Place some consonants, one by one, before it, as **ba, da, fa, la, pa**, etc. Class to watch the teacher's mouth while he slowly pronounces each syllable, afterwards repeating each syllable after him.

3. Now let the children take the same consonants with another vowel (**E**). A new set of syllables is produced, as **be, de, fe, le, pe**, etc. The teacher goes through the same steps as before, the class carefully noticing his mouth.
4. Then let the teacher *contrast* the two series, placing them side by side, and having them repeated alternately; e.g., **ba, be, da, de**, etc. A few combinations like this will be enough for one lesson. Do not weary the children so as to breed a dislike for the work.
5. Then to fix the syllables let them form them with their *kindergarten sticks*, and repeat them when formed. They should next form the same syllables from the *letter box*, going through the same process.
6. As a final exercise the syllables might be repeated first *simultaneously* and then *individually*.

Card and Primer Stage.

Object.—To teach words of 3 or 4 letters, or even more letters when the words are common; also to teach the powers of the letters in combination.

Apparatus.

1. A set of cards containing easy words of 3 or 4 letters.
2. A very easy primer containing not more than 40 pages. The book is to be printed in large type; the words of more than one syllable are to be divided, and the book should be well illustrated. *A child's first acquaintance with a book must be a pleasant memory.*
3. Use the cards at first; then sometimes cards and sometimes books; then books alone.

Lesson.

1. The earlier cards might be arranged on the Phonic Method. The teacher could name the first sound, the class could repeat it simultaneously, then several pupils individually; e.g., **-at, b-at, c-at, h-at, p-at**, etc., *the teacher prefixing the consonants.*
2. Then *double consonants* might be prefixed—**sb-at, sc-at, sh-at, sp-at**, etc. The children again to repeat after the teacher.
3. A few other *combinations* might be treated in the same way. In each case the teacher must test by sample.
4. A card should then be taken containing short sentences embodying the words thus taught, and these words should be read by the class. If there are no suitable cards the sentences should be written on the B.B. Too much word building is wearisome in one lesson: it is *reading* that interests the children.
5. When all the words of a sentence are known the sentence may be read with *expression* by the teacher, the children copying. There will probably be need to exaggerate the emphasis for young children, for they rarely reach the standard set them.
6. Any *difficult words* should be written on the B.B. during the lesson, and spelt and learnt orally within reasonable limits, for it is not advisable to have too much interruption in a reading lesson.
7. A few lessons of this kind will enable the children to use the *cards* and *primers* very soon. With these the teacher should read *single words*, the class repeating after him until a sentence is known. This should then be re-read by the teacher for proper *expression*, the class imitating, and several scholars following individually. Each sentence can be mastered in this way.
8. *The paragraphs* should be recapitulated in the same manner as sentences. This will supply the very essential element of *connected* reading, which is a pleasurable acquisition to most children.
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METHODS OF TEACHING READING.

The difficulty and importance of reading as a subject of instruction are shown by the methodised attempts that have been made to improve its teaching. There are a number of methods in use, and, as usual, where interest or necessity has called forth many efforts, there is the usual conflict of opinion as to the relative merits of the various systems in use. Each of the best known systems is here dealt with briefly. The salient points are noticed and followed with a criticism in each case. The best known of the methods are the following :—

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Some of these are analytic, some synthetic, whilst some are more or less a combination of the two. But whatever method may be used, there are certain *general principles* or processes of instruction, which must more or less regulate all methods. There must always be :—

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at, et, it, ot, ut,
ab, eb, ib, ob, ub,
ac, ec, ic, oc, uc, and so on.

3. Then a consonant is affixed ; e.g. :—

bat, bet, bot, bit, but,
dab, dib, deb, dob, dub, etc.

4. The short vowels are then lengthened by the addition of e ; e.g., bate,
bete, bite, bote, bute.

It is a word building *synthetic method*.

Advantages.	Disadvantages.
<p>1. It is claimed that it is a method for <i>teaching reading and spelling together, and the reading through the spelling</i> : but this is hardly true. The converse is the case.</p> <p>2. There is a <i>saving of labour</i>, the work requisite for learning the one being made available for learning the other.</p> <p>3. It has the <i>sanction of long usage</i>, but is now rapidly becoming obsolete.</p> <p>4. <i>It appears to be the natural method</i> to begin elements, and to proceed to combinations ; i.e., from the simple to the complex.</p> <p>5. The sounds of the letters composing words when uttered in quick succession sometimes suggest the sound of the word itself.</p>	<p>1. This combination of teaching reading and spelling together is <i>awkward and unnatural</i>. In many irregular words the spelling is a <i>hindrance</i> to acquiring the word sound.</p> <p>2. The saving of time is illusory, for one subject interferes with the other ; and the introduction of awkward and useless spelling combinations is a <i>waste of time</i>.</p> <p>3. Spelling rests on a habit of the eye, and therefore <i>this method inverts the proper relation of these subjects</i> ; for reading gives natural facilities for learning spelling, whereas by this method those facilities are lost, because the attention is distracted from the reading to the spelling.</p> <p>4. Our alphabet is very imperfect, hence any method of teaching reading based upon it must necessarily be <i>imperfect</i> also.</p> <p>5. It encourages <i>indolence</i>, for frequent repetitions of the letters of a word will at length suggest the word itself, and consequently the learner does not put forth the necessary degree of attention for mastering words.</p> <p>6. It is <i>contrary to the actual method of acquiring spoken language</i>. In talking a child learns words first.</p> <p>7. The method is <i>tedious</i>, and very often produces a dislike for reading.</p> <p>8. <i>It is wrong in principle</i>. It applies synthesis to the mastery of form by the eye ; whereas form must first be learnt as a whole.</p>

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1. Take a group of easily constructed letters—I, X, V, T, L, H, etc.
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1. Teach those first which are *most like the capitals*; e.g., c, o, x, z, v, w, s.
2. Group those likely to be *confused* and *compare* and *contrast* them; e.g., b, d; p, q; m, n, u, v.
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1. The analysis of the sound of a word into its component sounds.
2. The power to recognise the picture (letter) of the sound, and to articulate it.
3. The application to new cases.

Taking any common word as an illustration, the process might be as follows:—

1. Take the word **bat**, and try to give the sound of each letter in it, thus **bă-a-tă**.
2. Then pronounce the word **bat**. Get the pupils to notice the sound of your lips, and their position, whilst saying **b**; then say **bă**. The children notice the difference at once, and can then imitate these sounds.
3. The *reverse process* is then pursued. The entire word is sounded, and the children are required to give the sounds of the letters.
4. A picture (**b**) of the sound is then shown. The usual devices must then be used for fixing the picture and the sound.
5. Lip work or *silent spelling* then follows. The children watch the teacher's mouth, and recognise the letters from the shape of the lips. The same process in its entirety should be adopted for other letters.
6. The sound of two or more letters in combination like **a-tă** is next taught.
7. Other letters with which the children are familiar could then be prefixed, and the words sounded; *e.g.*, (**b**)**at**, (**o**)**at**, (**p**)**at**. This is an exercise in *word building* or vocabularies.
8. The last step should be the combination of the words learned into *easy narrative*.

Advantages.	Disadvantages.
<ol style="list-style-type: none"> 1. If adopted <i>in its purity</i> it would greatly facilitate the process of learning to read. It is asserted that it extends the words of regular notation to 75 per cent. of the whole, leaving 25 per cent. only for the Look-and-Say Method. 2. It is a good method for obtaining <i>good articulation</i>, and accurate and careful <i>enunciation</i>. 3. Theoretically the method is sound, the pronunciation of a whole being taught by the pronunciation of the parts. 4. It teaches reading and spelling together. 5. It enables children to apply their knowledge to fresh cases. 6. Some teachers have made it very effective; and more or less it forms part of the methods used by most teachers. 	<ol style="list-style-type: none"> 1. A purely phonic method is possible only where the number of letters and elementary sounds correspond. But in English the letters are only five-eighths of the elementary sounds. 2. The same letter ought always to represent the same sound, but one letter often represents two or more sounds. 3. Some sounds are represented by more than one letter. 4. Some letters are silent. 5. "It is nothing but a variety of the Alphabetic Method with other names to the letters." 6. <i>It is wrong in principle</i>, as it applies synthesis to the mastery of form by the eye. 7. <i>The system is too elaborate and too complex for rough usage.</i> 8. <i>It requires special preparation</i>, and therefore cannot very well be entrusted to a young teacher. 9. The attempt to give the powers of the labials, dentals, and liquids, has a tendency to induce <i>stammering</i>.

THE PHONETIC METHOD.

Description.

This is a method designed to meet some of the difficulties of the Phonic Method. The *principle* of the method is that the rapid

utterance of the sounds of the letters of a word will give the sound of the word itself. Each of the ordinary letters has a single sound, and then the rest of the elementary sounds of the language are provided for by variations of the letters in use. These variations are expressed by means of *diacritical* signs; e.g., the letter *a* has four sounds, which are thus expressed :—

- | | | | | |
|----|---------|----------|-------|---------------|
| 1. | No mark | <i>a</i> | as in | <i>cat</i> . |
| 2. | | <i>ā</i> | „ | <i>fare</i> . |
| 3. | | <i>ä</i> | „ | <i>cür</i> . |
| 4. | | <i>â</i> | „ | <i>cáll</i> . |

This arrangement extends the alphabet to 65 symbols, 32 of which are vowels, and 33 consonants. The distinction between some of the symbols is very fine, and it requires care to distinguish them. *Type* arrangements help. *Silent letters* are printed in italics, as *dumb*, *knife*; while *whispered consonants* are done in *light type*, as (s)ing, (s)ound. The *diphthongs* are expressed by means of *diagraphs*, as b-oa-t. The sounds of this extended alphabet are given first, and the word sound is then supposed to follow, and the nearer the alphabet comes to perfection the truer this is. After the lessons have been given in the extended alphabet, they are then repeated in the ordinary alphabet.

Criticism.—The advantages of this method are much the same as those of the Phonic Method, but it only removes some of the disadvantages of that method to make room for others. The first four difficulties disappear with the extended alphabet, but the others remain, and are reinforced by the following additions :—

1. The new letters make it look like a strange language.
2. It destroys the face history of words and their origin.
3. Special books are required.
4. There are two alphabets to learn, and one of them a very long one, with very fine differences. Hence the work becomes wearying, tends to confusion, and proves a hindrance rather than a help to acquiring the art of reading, for in some cases two forms for the same word have to be learnt.
5. It does not remove the difficulties of our alphabet; it only postpones them.

THE LOOK-AND-SAY METHOD.

Description.

This is a method of reading without spelling. Each word is taught as a whole, and its sound is associated with it as a whole. The learning of the alphabet is no part of the plan, although it gets to be known by the children. The method may be briefly illustrated as follows :—

1. The teacher takes a reading sheet containing short sentences. He points to a word, pronounces it, and the class repeats it after him. A sentence is thus read.
2. He then requires the class to read the same sentence simultaneously as he points to the words.
3. Then some child is selected to read it.
4. The teacher might then point to the same words in other parts of the sheet, and ask the children to name them.
5. The children next begin to notice differences in apparent similarities, *e.g.*, *felt* and *left*; *saw* and *was*; *on* and *no*. Up to this point the child has only noticed form as a whole. Now the *analytic* process begins, and he recognises some of the elements.
6. The children might next be introduced to books. They should always point to each word as it is read. As they improve in their reading this becomes less important, and eventually it may be dropped altogether.

Advantages.	Disadvantages.
<p>1. The word is mastered by the eye. Children <i>talk words</i> when they enter school; now they learn to recognise <i>pictures</i> of words. The child has something to start with, and so starts with some advantage.</p> <p>2. It enables the child not only to <i>recognise the word in the sign</i>, but to acquire practical acquaintance with the <i>powers of letters and syllables</i>, for it associates sound, sign, and idea, in a natural way.</p> <p>3. It is <i>suitable</i> to the circumstances of common schools.</p> <p>(a) It meets the best requirements of class instruction by stimulating <i>attention</i> and self-respect. <i>A child learns to read quicker by this method than by any other</i>, and it brings <i>interest</i> because the child is dealing with words which it knows.</p> <p>(b) It requires <i>no special preparation</i>, and so can be entrusted to a young teacher.</p> <p>(c) It <i>impresses by frequent repetition</i>. Many words can be learned by no other method, and these are the most common in child vocabularies.</p> <p>4. "It gives more practice in sounding letters in combination, hence the necessary <i>mental generalisations</i> for acquiring the powers of letters and syllables are more readily acquired."</p> <p>5. It is the method which forms the basis of the methods adopted by most teachers. Few, perhaps none, use it in its purity, but many approximate to it.</p>	<p>1. It is a <i>Chinese method</i>. This is an unjust and an untrue criticism, for although each word symbol is learned independently, yet when the word is known as a whole it is analysed into its elements. In Chinese no such analysis is possible. This objection is wrong in another point; it assumes that the method gives no power to master new words.</p> <p>2. A habit of <i>guessing</i> will be formed in the earlier lessons, unless great care is exercised.</p> <p>3. It may produce <i>carelessness</i>—words of similar form are sometimes confounded—<i>indistinct articulation and bad enunciation</i>.</p> <p>4. It requires <i>supplementing by the Phonic Method and by transcription</i>. Some assert that the power to apply the knowledge of reading to new words is not so rapidly developed as by the Phonic Method. This may be true for words of regular notation, but it is hardly true of the less regular words, which, be it remembered, are numerous and common.</p> <p>5. Unless the teacher exercises great watchfulness, its <i>moral effects are bad</i>. Pupils pretend to read or point, and so attempt to deceive the teacher.</p> <p>6. It may breed <i>laziness</i>. The idle or indifferent will seek to shelter themselves under the chorus of class voices.</p> <p>7. It may in some measure <i>demoralise the teacher</i> without zeal. The chorus of sound is supposed evidence of work, and he is content to rest to the hum of the voices. But this objection can only apply to simultaneous reading, and then it is true of all methods.</p> <p>8. <i>Spelling</i> is likely to suffer if the method is not supplemented.</p>

THE SYLLABIC METHOD.

This is only a modified form of the Look-and-Say Method. The principle is practically the same, for words are still learned as a whole for monosyllables. The variation occurs with words of more than one syllable. Briefly, the method may be summarised as follows :—

1. Words of *one syllable* are first mastered on the Look-and-Say Method.
2. The method then proceeds to *words of more than one syllable*, the words being carefully graduated.
3. *These words are then broken up into syllables*, words of regular notation being first taken.
4. The children are then *taught each syllable on the Look-and-Say plan*.
5. The *complete* word is then sounded.
6. The *syllables are always classified*, the commonest being taken first.

THE METHOD OF PHONIC ANALYSIS.

Description.

This method is based upon the comparison of sounds, and, as its name implies, is a combination of the Phonic and Look-and-Say Methods. The idea is to use the Look-and-Say as a basis, then to combine the two, and, finally, for all words of regular notation, to use the Phonic Method. It is an attempt to combine the best points of the two most popular methods.

1. The *first lessons are on the Look-and-Say Method* for the acquirement of monosyllables and short irregular words of common use.
2. Next, *words are analysed* where they conveniently admit of it ; e.g., **and** = **an-d**, **pad** = **p-ad**, **bad** = **b-ad**.
3. The *completing sound* (initial or final) is done by the *Phonic Method* ; e.g., **h-am**, **j-am**, **s-am**, **r-am**.
 - (a) **Vocal**. The process is as follows :—*The word am is slowly spoken*, and the children are invited to watch the teacher's mouth at the time, noting the use of the vocal organs. Then the class utters the word. Repetition is given until a child learns how a particular sound is produced.
 - (b) **Symbol**. *The word is next written on the B.B.*, and the initial or final letter is placed apart as above. The word is then slowly pronounced again, first the syllable, then the whole sound. The children are then told that the separated letter is the sign for the completing sound.
4. When a number of words have been learnt in this way they are compared. This *comparison* is an important element in the method, for the powers of the consonants are taught by means of it ; e.g., **(c)an**, **(f)an**, **(m)an**, **(p)an**, **(b)an**, **(t)an**, **(r)an**, **(d)an**.
5. When the children have progressed thus far *phonic drill and comparison are used for the acquisition of new words*.
6. Words are carefully *classified*, the more irregular being introduced gradually.
7. *Sentence reading* follows each new acquisition and embraces any of the words already learned.
8. In the final stages the *Phonic Method* is used only.

Advantages.	Disadvantages.
<ol style="list-style-type: none"> 1. It is a <i>good spelling method</i>. The combination of the Look-and-Say and the Phonic is a good one. 2. It gives a <i>certain amount of power to recognise fresh words</i> by directing the attention to the structure of words. 3. It conduces to <i>good enunciation, articulation, and pronunciation</i> by teaching the powers of the letters. 4. It is <i>less Chinese</i> than the Look-and-Say, and <i>less absurd</i> than the Phonic. 	<ol style="list-style-type: none"> 1. It is weak or <i>wrong in principle</i>, for it fixes the attention more on the parts than the whole. 2. It is <i>not suited to the circumstances of many schools</i>, for it would require very careful preparation, and could not well be entrusted to a young teacher. 3. <i>Special sets of reading books</i> would be required to suit the plan. A series of progressive, carefully graduated lessons would be required. 4. As in the Phonic Method, the attempt to give the powers of the letters might induce <i>stammering</i> in some cases.

THE COMBINED METHOD.

The Combined Method, as its name implies, is a composition formed by contributions from all the other methods. Probably in no two schools is it alike, for the constituents are mixed by different teachers in different proportions. But whatever may be the relative proportions of the contributing methods, it is by common consent the best method, and for this reason we sometimes find it described as the *Eclectic Method*. Anything that is good in the other methods is appropriated, and, as far as possible, incorporated in this. *The Look-and-Say forms the basis*, but the *word building and spelling of the Alphabetic, the powers of the letters and the word building of the Phonic, the syllabic treatment of words of the Syllabic, and the analysis and comparison of the Phono-Analytic* are all used. Another great feature of the method is its *elasticity*. The teacher is at liberty to use any portion of any method at any particular moment, when it may be applied with most advantage. Probably most teachers knowingly or unknowingly use this method. It has already been pointed out that it may present any number of combinations, one of which is given as a sample. But the "personal equation" will always be an important factor in such a method as this.

1. The *alphabet* may be taught as in the *Alphabetic Method* by some of the many pleasant devices now in use.
2. *Easy words* could then be taught on the *Look-and-Say plan*.
3. The *powers of the consonants* could then be taught as in the *Phono-Analytic Method*.
4. *Reading lessons on the Look-and-Say plan* could still go on, but they should be varied and supplemented by lessons on *word building as in the Phonic Method*.
5. *Specially difficult words* could be written on the B.B., *analysed* as in the *Syllabic Method*, and *spelled* as in the *Alphabetic Method*.

6. *Simultaneous reading* could be practised on the *Look-and-Say plan* from the pattern work of the teacher.
7. Plenty of *individual practice* should be given, and the necessary corrections should be made in any method most suitable.

THE ENGLISH METHOD.

Description.

This is a method of teaching reading which has been elaborated by Messrs. Sonnenschein and Meiklejohn. It is a *word-building plan*, and an attempt to analyse and classify the fundamental combinations of the language. It is called the English Method.

The plan consists of four courses.

I. *The Nursery Book or Two Letter Word Sheets.* This book contains 1 lessons carefully graded, and the progressive nature of the lessons can be graphically represented thus :—

Lesson.	Consisting of
1	a, i.
2	a, i, o, go, so.
3	a, i, o, go, so, ho, lo, no.
4	a, i, o, go, so, ho, lo, no, ox, on, of, or, and so on.

II. *The First or AT Course.* This consists of short vowels with single consonants. It "consists entirely of A, E, I, O, U, with the addition to them of one letter in each lesson. The child is intended to learn one letter in each lesson—not its name, but its function or use. Capitals are introduced in the order of their difficulty, thus I or S is easier than P; P than G; and so on. "The child should write or print on his slate the *practice*, the *lesson*, and as many of the *sentences* as there is time for with neatness and clearness."

Plan of a Lesson for First Course.

1. *Practice.*—The book is divided into sections, of which there are 23. Each section begins with a *practice*, which contains all the vowel combinations used in that section. The *practice* is read off on the Look-and-Say Method, both horizontally and perpendicularly, till the pupils know every syllable. The first *practice* is given in illustration.

at	et	it	ot	ut
et	at	ot	ut	it
it	ut	at	et	ot
ot	it	ut	at	et
ut	ot	et	it	at

2. *Lesson.*—The *lesson* then follows, in which these syllables are combined with a consonant *b*, hence we get lists of words and syllables such as *bat, be, bit, bot, but*. Lists are made as in the *practice*, and they are first read across then down, till known. The teacher then points at words here and there.

3. *Exercise.*—An *exercise* then follows of short sentences composed of words of two or three letters, like

It is on the bat;
It is a bit of the bat.

Lessons and exercises then follow each other to the end of the section towards which the exercises become more numerous.

4. *Second Practice.*—This introduces a fresh combination. Another consonant is chosen, and the same method is pursued.

III. *The Second or ANT Course.* This course consists of short vowels with double consonants. It is the first course, with the addition of a second consonant.

Lesson and exercise now follow each other, but the lesson is divided into two parts.

(a) Syllables are given to practise until fully known.

(b) These syllables are combined *instantaneously* into words of two syllables.

The Bridge.—There is a *bridge* between this course and the next. A series of words and syllables is given, and the pupil has to say which are words and which not; e.g. :—

at	et	ot	ad
lat	ret	lot	lad
flat	pret	plot	clad and so on.

The bridge is not introduced until the later lessons.

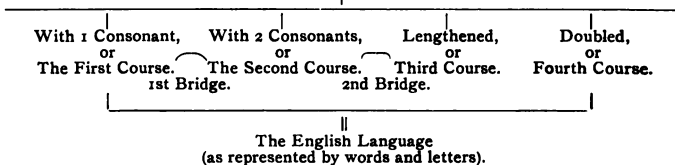
IV. *The Third Course.* This consists of long vowels. It is the first course again, "but with the vowels lengthened, and the learner will at once find that this comes about by the addition of a final *e*".

Stories then follow written without the help of any words with double vowels. Practice, lesson, and exercise follow each other as before.

V. *The Fourth Course* contains all the double vowels in the language with apparent anomalies, and some words that cannot be classified.

The whole method may be graphically illustrated as follows :—

A, E, I, O, U.



Advantages.	Disadvantages.
<ol style="list-style-type: none"> 1. It is <i>synthetic</i>. 2. It is <i>well graded</i>. The lessons are progressive and systematic. Difficulties are carefully bridged. 3. It introduces plenty of <i>recapitulation</i>. 4. It enables the pupil to see the <i>symmetry and regularity</i> of the English language as a whole. 5. It soon gives the pupils a <i>feeling of mastery and a sensation of progress</i>. 6. Children trained on this system have always been <i>thoroughly good spellers</i>. They spell by principle and law. 7. It is <i>thorough and comprehensive</i>. By the arithmetical process of permutations and combinations every actual and possible syllable in the English language is introduced, and accepted or rejected as is considered right in each individual case. 	<ol style="list-style-type: none"> 1. It is <i>unnatural</i>. Children should learn to read as they learn to talk. Words are not difficult for reading purposes altogether, either from the fewness or from the number of their letters, but from their degree of familiarity or otherwise to the children. 2. Like all synthetic methods it is <i>wrong in principle</i>. See Alphabetic Method, Disadvantages, 8. 3. It is <i>dull and uninteresting</i>. It is difficult to conceive any love for a subject hanging round such a bag of dry bones. Children trained under this system, who have developed a love for reading, must have acquired that feeling from the personal qualities of the teacher or themselves. 4. It may make good spellers, but this is a reading system and not a spelling one. 5. Speaking generally, it is a well-classified edition of the Phonic System, and has many of its disadvantages. 6. It is <i>not popular</i>. Relatively few teachers know it, and fewer practise it, although it has already attained its majority.

NOTES OF A READING LESSON.

I. Preparation.

1. Language.

The chapter should be read through and marked.

1. To show the amount read by each child.
2. To mark emphasis and accent where necessary.
3. To prepare a list of difficult words for learning.
4. To mark words producing provincialisms.
5. With a young class to prepare a list of words likely to be confused, e.g., *saw* and *was*, or mispronounced.

2. Subject Matter.

1. Explanation of allusions (if any).
 2. To prepare a few illustrations (if necessary).
 3. To be able to give a brief explanation of the whole chapter.
- As a rule the mechanical difficulties will be the chief with a young class, but generally the difficulties will depend upon—
- (1) The attendance.
 - (2) The ability and zeal of the teacher.
 - (3) The subject matter read.
 - (4) The arrangement of the time table.

II. Sample of Subject Matter.—In writing notes for a reading lesson it will only be necessary to take a portion of the subject matter to show how you would deal with it.

"Who is this that cometh from the south, thinly clad in a light *transparent garment*? Her breath is hot and *sultry*; she seeks the *refreshment* of the *cool shade*; she seeks the *crystal brook* to bathe her *languid limbs*. The *tanned haymakers* welcome her coming, and the *sheep shearers* who clip the *fleeces* of his flock with his *sounding shears*."

III. Introduction.

1. The class must be properly arranged. This will depend upon the nature of rooms and the space at the disposal of the teacher. Where possible the class should always stand for reading—
 - (a) In semicircular drafts for small classes.
 - (b) In parallel rows, the shortest children being in front, for larger classes.
- In many of our large modern schools the children have to take their reading lesson in the desks.
2. Arrangements should be made for the proper and orderly passing of the books.
 3. The position of each child should be comfortable and orderly.
 4. There should be a few minutes' conversation on the subject matter to ensure understanding.
 5. New words and difficult words should be written on the B.B., and rapidly learned. There need be no explanation at this stage.

IV. The Lesson.—There are two chief objects which must be kept in view in giving the lesson.

1. To extend the pupil's knowledge of language by enlarging his stock of words, and making them plain to him.
2. To enable him to grasp the ideas in his book, so as to get intelligent reading.

A. Mechanical Difficulties.

1. **Pattern Reading.**—The teacher will pattern read for imitation by the class. This may be done by sentences, by several sentences, or by the class. The wants and abilities of the classes must decide how. After the primary

pattern reading of the teacher, *secondary pattern work* may be given by some of the better scholars. Where the class possesses some very good readers, much of the primary pattern work should be thrown on them.

2. Imitation by Scholars.—The scholars will then imitate the pattern set them. This again may be varied. It may take the form of—

- (a) Individual imitation.
- (b) Sectional imitation. This is a useful practice, as it arouses emulation.
- (c) Class imitation.

3. Practice: Simultaneous and Individual.—Plenty of time should be allowed in the lesson for practice in reading unpatterned portions. A portion might be read individually, and then simultaneously. The object should be to give as much practice as possible.

B. Difficulties of Language.—The amount and quality of the explanation will depend upon the class. As a rule, too much should not be attempted, but no dogmatic directions can be given. The anticipated difficulties should be underlined in the teacher's book.

Words and Phrases for Explanation (in sample).

- (a) *Who is this, etc.* Personification of the S.W. wind. Explain that the whole piece is personification (if necessary explain personification). Describe the characteristics of the S. wind to the class, and show the appropriate nature of the various descriptions.
- (b) *Clad in a bright, etc.* Referring to the clear sky which generally accompanies this wind.
- (c) *Hot and sultry breath.* A reference to the warmth of this wind. Breath is wind. The simile is good, for a hot breath would indicate a condition of bodily languor.
- (d) *Crystal brook.* Show a crystal, and let the class see how it sparkles. The brook sparkles in the sun like a crystal.
- (e) *Languid limbs.* A reference to the fatiguing effects of the S. wind.

C. Difficulties of Style.

- 1. *Punctuation.* The teacher must insist upon the punctuation marks receiving proper attention and proper interpretation. Plenty of correction, pattern work, and explanation will be required.
- 2. *Emphasis* should be placed on *this, hot, sultry, tanned haymakers and sheep shearers.* Where necessary *accent* must receive attention.
- 3. *Intelligence.* Where children do not understand what they are reading, style must necessarily be bad. The efficient explanation of IV. (B) will facilitate the necessary understanding.
- 4. *Voice.* The voice should be nicely pitched with varied cadence. There must be no artificiality, and the pace must not be too fast. Enunciation and articulation must be pure and distinct.

D. Discipline.

- 1. Some points of discipline have already been mentioned under the head of introduction. These include the *position of the scholars, the distribution and collection of books, the arrangement of the class.*
- 2. The *teacher's position* should allow every child to fall within his range of vision.
- 3. The *room* should be physically comfortable. Noise, glare, and distractions of every kind should be removed.
- 4. *Each child should have a book.* There should be no "looking over".
- 5. *Children should not always read in turn.* When inattention is detected or suspected, the offender should immediately be called upon to read.

HOW TO DEAL WITH ANOMALOUS DIFFICULTIES IN READING.

These may be illustrated by some such passage as the following extract (1879):—

"He would take no pains to teach any boy who could not at least write what boys of eight years old can write".

Like Sounds and Unlike Spellings.	Like Spellings and Unlike Sounds.												
<p>1. Would.—<i>Wood, hood, good, could</i>; compare and contrast, and note the silent <i>l</i>.</p> <p>2. Pains.—<i>Panes, canes, reigns, deigns, reins, reins.</i> Compare and contrast again.</p> <p>3. Teach.—The <i>ea</i> sound needs attention here. Compare it with <i>reach, preach, tea, sea</i>; and contrast with <i>screech, breech, teeth, see</i>.</p> <p>4. Any.—Compare with <i>many</i> and contrast with <i>penny</i>. Call attention to the sounds of <i>a</i> and <i>e</i>.</p> <p>5. Who, What.—Teacher to pattern the correct sound; class to imitate it. <i>Phonic drill</i> should be given on other combinations like—</p> <table><tr><td>which</td><td>where</td><td>while</td></tr><tr><td>when</td><td>whither</td><td>whether</td></tr><tr><td>whilst</td><td>whom</td><td>wheel</td></tr><tr><td>white</td><td>whire</td><td>whose</td></tr></table> <p>The pronunciation of <i>who</i> might then be compared with <i>do</i> and <i>coo</i>; <i>what</i> might be contrasted with <i>pot, lot, got</i>.</p> <p>6. Write.—Compare with <i>rite, mite, spite, kite</i>, and contrast with <i>right, height, fight, sleight</i>.</p> <p>7. Eight.—Compare with <i>ate, hate, late, plate, slate, skate, mate, pate, bate, rate, date, fate</i>.</p>	which	where	while	when	whither	whether	whilst	whom	wheel	white	whire	whose	<p>1. Would.—<i>Gould, bould(er), mould.</i> Here the syllabic combinations are alike, but the sounds are different.</p> <p>2. Pains.—<i>Mountain, captain.</i> Contrast with <i>pains</i>, and compare <i>pains</i> with <i>disdain, maintain, again</i>.</p> <p>3. Teach.—This word presents no difficulties under this head.</p> <p>4. Any.—Contrast with <i>litany, Bethany</i>.</p> <p>5. Who, What.—<i>Who</i> might be compared with <i>whom</i> and contrasted with <i>whorl</i>. <i>What</i> will present no difficulties under this head.</p> <p>6. Write.—No difficulty under this head. Practically <i>ite</i> is an invariable sound.</p> <p>7. Eight.—Contrast with <i>sleight</i> and <i>height</i>.</p>
which	where	while											
when	whither	whether											
whilst	whom	wheel											
white	whire	whose											

In all these cases *contrast* and *comparison* should be brought into play, and the similarities and differences should be placed side by side on the B.B. The words should be *spelled, written* on slates or paper, *learned, explained* where necessary, and then *dictated*. Sentences should then be given containing them, and these should be dictated and read. The class should then be given *sentence composition* on these words.

QUALITIES OF GOOD READING.

These may roughly be divided into two classes—mechanical and mental. The two classes are not mutually exclusive, but the difference is sufficient to afford a basis for classification.

I. Mechanical.

1. **Pronunciation.**—*Correct pronunciation depends upon the proper sounding of the vowels*, for there can be no purity of utterance unless they receive their right quantities and powers. Many of our provincialisms are due to incorrect pronunciation of vowels.

2. **Enunciation.**—The aspirate, the **th**, the **r**, the final **g** are difficulties. Various other combinations will suggest themselves, and the student is advised to compose a list for himself. As good pronunciation depends on vowels, so

good enunciation depends upon the correct sounding of the consonants. Where any pronounced and general defect exists *vocal drill* should be regularly given for its cure.

3. Articulation.—By articulation is meant *the proper fitting of one syllable on to another.* The derivation of the word (Lat., *artus*, a joint) reveals its meaning. It has a threefold reference :—

- (a) The proper formation of elementary sounds.
- (b) The formation of these sounds into distinct syllables.
- (c) The formation of these syllables into words.

Bad articulation is often due to faulty enunciation. Children are slovenly, too quick, careless, and inattentive at times; whereas "in just articulation the words are not hurried over nor melted together; they are neither abridged nor prolonged; they are not swallowed nor are they shot from the mouth; neither are they trailed, and then suffered to drop unfinished; but they are delivered from the lips, as beautiful coins are issued from the mint, deeply and accurately impressed, neatly struck by the proper organs—distinct, sharp, perfectly finished".

4. Pitch.—School children often read too loud, and their voices are just as often pitched too high. There can be no invariable standard for all; but the pitch generally should be that which permits of an easy, audible, unfatiguing production.

5. Modulation and Tone.—By modulation is meant *variation in the pitch of the voice*, so as to produce what is sometimes called cadence or tone. The rising and falling inflection gives that change of intonation which makes a voice pleasant to listen to, and facilitates attention. The tone requires to be pleasant and distinct, but not boisterous or noisy. Where there is no modulation, for the listener there is probably little comfort, and for the reader probably less understanding. These two qualities of reading are difficult to deal with. They are more often gifts than acquisitions, and any drilling in them often produces a stilted and artificial style.

6. Pace.—*The subject matter will always determine the pace.* The voice should give a fair translation of the sentiments it is uttering, or the emotions it is revealing. But it should never be fast unless the reader is blessed with a clear and audible production. Drawing is the other extreme, and it is just as bad. Obviously pace is a varying quantity, and may have to change many times in the same chapter.

7. Accent.—*This is a superior force of voice or of articulative effort upon some particular syllable of a word distinguishing it from the others.* Sometimes it means more than this when it signifies a peculiar or characteristic modulation or modification of the voice, as when we say a person speaks with a good accent. In poetry it also indicates a slight stress upon a tone to mark its position in the measure. In such cases the accent is regular, and marks the flow of the rhythm.

In *Gill's School Management* a much wider function is claimed for accent. There it is stated that "accent is a stress or bounding of the voice, followed by a slight pause, which groups in pronunciation those words that are so closely combined in sense as to convey but one notion, and to separate which would be to destroy the sense. It also draws attention to that word on which the notion to be conveyed depends. By means of accent phrases are read, not as a succession of words, but as a series of notions, which are in this way made distinct. In fact, accent is the expedient by which every distinct notion is separated and distinguished in reading. In some cases, two phrases are so intimately joined in sense as to form but one compound notion; and at such times two accents are heard, a primary and a secondary—the primary being placed on the word that limits the phrase, or renders it more specific." If all this can be justly claimed as the work of accent, then it would have to be classed as a mental rather than a mechanical quality.

II. Mental.

1. **Emphasis.**—By this is meant *the stress of utterance or force of voice given to the words or parts of statements intended to be specially impressed on the listener*. It often removes the accent from its natural or customary position to some other word in the sentence. Its chief effect is to indicate a *contrast*, e.g. :—

This is the house that Jack built—this and no other.

This is the *house* that Jack built—as contrasted with other buildings.

This is the house that *Jack* built—as contrasted with other builders.

This is the house that Jack *built*—as contrasted with others he may have bought, etc.

It requires good analytic power, and it is this that makes it a mental attribute of reading; for a proper analysis means a clear understanding. There are a variety of ways of expressing it. The voice may be raised and intensified, or lowered and softened; there may be a sudden change of voice, the use of the pause, or even gesture may be utilised.

2. **Phrasing.**—This involves a proper understanding and translation of punctuation, and something more. Words have to be grouped into notions, and the various relations of these groups of words have to be vocally indicated. Like emphasis, this makes substantial demands on the intelligence, and requires good analytic power.

3. **Fluency.**—Certain *mechanical conditions* are essential for fluency. The type must be good, the light abundant without glare, good eyesight, and a comfortable position. The words have to be readily recognised and easily uttered. There must be no *physical defects*, such as stammering, or faults of habit, such as slurring, stumbling, and miscalling. The eye has to run on in advance of the voice, and the mind has to instantaneously interpret the sense. The words must come naturally. Fluent reading must not be confounded with rapid reading. Reading may be rapid, but incorrect and unintelligent. It may be a mere patter or stilted, and in none of these cases is it fluent. Plenty of practice will be required.

4. **Intelligence.**—If the reading is to be good the child must *understand* what it reads, hence *all the methods of teaching any of the school subjects should be intelligent*. Especially in reading lessons will *suitable matter* have to be chosen, and *suitable explanations* given where necessary. *Exposition lessons* are particularly serviceable for this purpose. If the reading does not put the listener in as good a position as the reader, the reading can hardly be called intelligent. All the qualities of good reading are essential constituents of intelligent reading, and the absence of any one is a defect.

5. **Expression.**—This is the highest quality of good reading. It embraces intelligent reading and something more, for reading may be intelligent without being expressive. *The reader enters into the spirit of the author, and gives it efficient interpretation*. The beauties of the language are presented so as to appeal to the audience. For its successful production it requires a very *sympathetic nature*; a nature that can feel the sentiments and emotions revealed with sufficient reality to give them vitality. It is most difficult to secure; but so far as it can be imparted, it may be done through the aid of suitable subject matter, good pattern work, the cultivation of the vocal powers of the class, by plenty of practice for fluency, by the cultivation of the heart as well as the head, by explanation, and by recitation. Perhaps the recitation of sympathetic pieces will be the best means, but dialogues, extracts from Shakespeare's plays, and kindred pieces, will also be serviceable.

From this list of the qualities of good reading the young teacher will easily be able to enumerate *the chief faults of reading*. He has only to present the converse of each quality, such as bad pronunciation, imperfect articulation, etc., and the short description appended under each head will enable him to recognise the fault and to suggest its cure.

SILENT READING.

Silent reading may be practised sometimes, but always under supervision, and *only in the higher classes*, where draft and simultaneous reading are less suitable than in the lower classes. A portion of reading may be mapped out, and the class allowed to read it, but some *oral questioning* should follow. A little *preparatory explanation*, skilfully and pertinently given, would arouse interest and make the exercise more successful. The practice has its *advantages*. The children are taught to cultivate a *love for reading* in this way, and this love may show itself in home reading through the medium of the school or circulating library. The process is *pleasurable*, for they read with little or no restriction; they are continuously occupied; they learn to rely on themselves for grasping the point and meaning of the subject matter; they are not harassed by the many points of discipline incidental to an oral reading lesson; they read with greater physical comfort; they read more than by the oral method; and they become better spellers.

SIMULTANEOUS READING.

I. Description.—The method and quantity will vary according to the class. Roughly speaking, there are three stages: (a) Words; (b) Phrases; (c) Sentences.

1. Words.—The teacher reads a word; the class pronounces it slowly after him, the enunciation being slow and distinct in each case. This process is followed to the end of the sentence. Repetition will probably be necessary. Then the sentence can be read by a few boys individually. A few sentences may be treated in this way, and they will be sufficient for one lesson.

2. Phrases.—Here a few words are first read by the teacher, and then repeated by the class, who point to the words as they are read. So far as possible, the teacher will make the phrases notional, and for this purpose the number of words will vary. A short chapter can be treated in this way, and each chapter should be mastered as follows:—

- (a) The teacher reads a *phrase*; the class reads the *next phrase*. This proceeds to the completion of the *first period*.
- (b) The teacher then pattern reads the *sentence*. The class copies simultaneously.
- (c) A few scholars might then be asked to read the sentence *individually*.
- (d) A *whole paragraph* could then be recapitulated by individual reading.
- (e) The *whole chapter* could be thus treated, paragraph by paragraph.

- (f) For *variety and emulation* the class might then be divided into two *sections*, each section reading set portions alternately and simultaneously.

- (g) The final step should be to read *the whole chapter individually*.

3. Sentences.—The pupils are now ready for sentences from their training in the last method. This is the best method:—

- (a) The teacher reads a *sentence*, or several sentences, slowly, with good emphasis and expression.
 (b) *The children follow simultaneously*, copying the pattern of the teacher. The whole lesson can be treated in this way.
 (c) *Sectional emulative simultaneous reading* should follow.
 (d) *Individual reading* again should be the final stage.

II. When Used.—In the early stages the practice is useless unless the child is following with its eye what it is saying with its voice. This makes pointing a necessity, otherwise the child will repeat from memory, or catch up what the other scholars are repeating. For these reasons it should be used with some moderation in the earliest classes. As soon as the eye can recognise words, then it may be used more generally. It will be used most in the lower classes of the upper departments and in the upper classes of the infant departments. In the higher classes it has its uses, and in the large classes of modern primary schools these uses are important; but the more individual reading a teacher can give to his pupils, the better for the pupils.

Advantages.	Disadvantages.
<ol style="list-style-type: none"> 1. It increases the <i>quantity</i> of reading for the class. 2. It increases the command over the organs of voice, and so facilitates <i>fluency</i>. 3. It improves <i>pronunciation, enunciation, and articulation</i> if carefully taught. Each has to go the same pace, and each is encouraged under cover of his class-fellows' voices to greater vocal effort. 4. The <i>pitch</i> of the voice is regulated, and <i>modulation</i> is learned, whilst common faults of <i>intonation</i> are cured. 5. It improves the <i>pace</i> of the reading, stimulating the slow and checking the fast. 6. It modifies individual <i>mannerisms</i>. 7. It improves the <i>intelligence</i> in some cases, especially when dove-tailed with individual reading. From the pattern reading of the teacher, and from the example and influence of the better readers, more expression is given, and the sense of the subject matter is better grasped. 	<ol style="list-style-type: none"> 1. It is uncertain whether the reader follows with his eye the words he repeats after the teacher. 2. Children, from too much repetition, get to repeat from memory, and it has often been found that they can proceed with the lesson without the aid of the book. 3. It may, in the hands of a poor, lazy, or careless teacher, encourage idleness, and even deception. 4. Unless taught with care it may produce <i>inaccuracy</i> and <i>indistinctness</i>, and accentuate the vocal faults it is well fitted to cure.

BACKWARD READERS.

The treatment of backward readers is a difficulty common to all schools. They require special attention, and should receive it both during, before, and after the lesson. The treatment will depend upon the cause, which may be the result of inaptitude or general dullness.

I. Inaptitude.—The poor reading may be simply a special case of inaptitude through bad or neglected teaching, or through relative dislike, owing to a strong preference for other subjects. Where special aptitudes exist, the teacher should take advantage of these to improve the reading. A pupil may excel at some other subject, although he may read and spell badly. The treatment is easy here. Time can well be spared from the strong subject for the weak one, and thus more practice will be obtained. The difficulties lie chiefly with word naming.

II. General Dullness.—Special treatment will be required in these cases.

1. Before the Lesson.

- (a) The backward scholars can be taught some of the more difficult words, which can be *written on the B.B. and learnt*. The words should be *briefly explained* where necessary, as they then become intelligent pictures to the children. The better readers could be employed at some other subject.
- (b) A list of the hardest or strangest words could have been given them *the night before* to learn, the teacher having previously pronounced each word carefully with the class.
- (c) Where *parental co-operation* is assured, the boys might be permitted to take home the reading book for the purpose of reading the chapter through. Where home help is forthcoming this assistance would be valuable. But, as a rule, this can only be done in better-class schools—generally where it is least wanted—and even there it will be found expensive, and at times not over thorough.
- (d) *Transcription, dictation, or composition* may be used before the reading lesson, to make them familiar with the chief mechanical difficulties.

2. During the Lesson.

- (a) Bad readers should be well under the teacher's eye, so that he may *super-
vise them well*; and he should see that they point and follow carefully all that is read.
- (b) A good reader, as a rule, should follow the pattern reading of the teacher. *It breeds confidence in the boys*, for the gulf between boy and boy is less than that between teacher and boy. A backward reader should then follow. He should read the piece through twice—thrice, if necessary—but he must read it perfectly before he finishes.
- (c) The weaker readers, being grouped together, might read a portion *simultaneously* after the teacher, and then simultaneously without the teacher, to be followed by one or two individual readers.

3. After the Lesson.

- (a) As word naming is the chief difficulty of the backward readers *the*

teacher might pursue the same course as before the lesson. His list of words will now have decreased, and a few minutes ought now to be sufficient.

- (b) Where home work is taken, the class might be asked to reproduce the substance of the chapter as an exercise in *composition*, or the composition might be done in school.
- (c) A *dictation lesson* might be given embodying the chief difficult words which ought to have been previously prepared and learned.
- (d) The class might do some *transcription* from the more difficult portions of the chapter, and learn the words as they write them.

Remember, it is unwise, as a rule, to place an older scholar in a lower class, however backward he may be. His feelings are hurt; he is probably thrown into a strong emotional state, which is most unfavourable to intellectual progress; and a hatred for the subject will be engendered, because his sympathies and tastes are probably not those of his class-fellows.

READING BOOKS.

I. Their Qualities.—Great care should be exercised in the choice of reading books, as they bear largely upon the character of the reading of the school. A book should never be rejected because it contains a few more pages than another, or a larger proportion of harder words. Such books are not always the most difficult to read or to teach. No book should be selected which does not embrace all the following principles :—

- 1. It must be *well printed and attractive*, and calculated to give pleasure.
- 2. It should impart some *knowledge*, and it should not be too childish or silly. A book can be humorous without either of these attributes.
- 3. It should be written in *English*, and not in the gibberish found in some early reading books.
- 4. It must be able to maintain *interest*. To do this consecutive stories are perhaps the best for young scholars. *Curiosity* and the *interest of pursuit* are great in this respect in young children. Short and scrappy pieces should be avoided, as they kill interest. The so-called "Educative" books are rarely a success as reading books, and if information be given at all it must be suitable in style.
- 5. The book must be *progressive*. Every lesson should contain a few new words, slightly increasing in difficulty.
- 6. The subject matter should aim to cultivate the *affections* and *moral feelings*, without obtruding the moral of the story. The moral can be wrapped up in the story, and so become more effective.

II. Variety.—There should always be more than one set of reading books to a class, as the pleasure of reading is destroyed by the monotony resulting from a limited supply. The affections and moral feelings are deadened by the endless repetition of the same lesson, which thus becomes a mere mechanical exercise, and nauseates the pupils. But little knowledge can be imparted, and no love of reading can be implanted, or good spelling outside such books be expected, or much intelligence be displayed, where the reading matter is foolishly too limited. It has been demonstrated repeatedly that those schools read best which do not con-

vert the minimum laid down in the Code into a maximum. Remember that one of the great aims of the teaching is to implant a love for the subject in the pupils, which is best attained by plenty and variety in the reading books.

III. Reading Books in Class Subjects.

1. Where the Class Subjects are Taught.—Geographical, historical, and elementary science reading books are valuable instruments of instruction in these subjects. The books should be used in all standards above the second. It is optional whether they are used in the first two standards; but where the books are suitable it is desirable. The *best* reading books for the higher standards are those which—

- (1) Are *descriptive and explanatory*.
- (2) Are *suitably illustrated*.
- (3) Contain *sufficient, varied, and interesting matter*.

It is not necessary that the lessons in the reading book should cover the whole area of the course of instruction adopted for the class subject. It is presumed that the teaching in such a subject will be mainly oral.

The chief *uses* of the reading book are:—

1. To give greater *definiteness* to the teaching.
2. To make thorough *recapitulation* easier and more effective.
3. To invest the subject with new *interest*.

—(Revised instructions to H. M. Inspectors.)

2. Where the Subjects are not Taught.—Here the books will require to be chosen with great care, and they should possess all the following characteristics:—

- (a) The subject matter must be *varied* and *suitable* to each standard.
- (b) The matter must be *interesting*; *suggestive* rather than *exhaustive*.
- (c) The facts and ideas should be expressed in *language* suited to the abilities of the children.
- (d) The book should be well and suitably *illustrated*.
- (e) The lessons should be suitable in *length*.
- (f) The book should be written on some *definite plan*; e.g., simple stories for an early standard; biographies for another, and so on.
- (g) *Technical terms* should be avoided in all but the highest standards; and English equivalents should be found for them.
- (h) The teaching, so far as set forth in the subject matter, should be *objective* and *experimental*, and a proper use should be made of maps, pictures, charts, and diagrams.
- (i) There should be no *cram* elements about the book. Long lists of names, tables, and tabulations should be omitted. It must always be remembered that the books are reading books.
- (j) *Difficult words* and ideas should be dealt with as in an ordinary reading lesson.

If these suggestions are practically heeded, the books will be found a valuable adjunct to the school education. The aim should

be to quicken the intelligence by a revelation of the interest of common things, places, and the incidents of everyday life. If the reading be attractive, a *taste* for further reading will have been given, and this is far more valuable than mere information which a tenacious memory may retain from the books. The spirit of inquiry, the thirst for knowledge, the widening of the interest, and consequently the increase in the pleasurable and useful potentialities of the pupils, will be a result which, although probably small in evidence, ought yet to gratify the teacher as the best success that can attend his efforts.

Fairy Tales as Reading Matter.

Should these fairy tales form part of the literature of our school children? There is a conflict of opinion on the subject; and arguments *pro* and *con* have been advanced, but the weight of argument seems to be in their favour.

I. For.

1. **Pleasure.**—They are *undoubted sources of pleasure*, and largely help to increase the sum total of child happiness, for they carry children into regions where pure and unadulterated happiness is supreme. They also afford a *stock of pleasant memories*.

2. **Education.**—*They breed a love for reading*, and for this reason are worthy of retention. They also cultivate the *imagination*.

3. **Morality.**—They are emotional in their effects, and exercise an influence on the hearts and dispositions of the children. *Every good fairy tale has an ethical purport*. It helps to solve the problems of life by exciting sympathy with the good and disgust with the bad. Whatever (if anything) can be said against the fairy tale in this respect, can be said at least with equal force against the novel, the romance, and the stage. In fact, it is an attractive way of teaching virtue without unduly obtruding the moral on the children.

4. **Faith.**—They teach the children to believe in friendly, though invisible, forces. The "guardian angel" becomes almost a reality to them, and a mental attitude is formed favourable to the reception of great religious truths, which rest on faith as their foundation.

5. **Hope.**—They help the young soul with its hopes and its desires to expand, and to aim at a *high ideal*. They lead to a hope for a happiness unknown in real life, but which nevertheless exists, because it is experienced under the spell of a fairy tale.

II. Against.

1. **Imagination.**—They are said to pervert and harm the imagination, being the creatures of unbridled imaginations themselves. The difficulty in training the imagination is to regulate it whilst stimulating its growth.

2. **Unreality.**—They give children false ideas of real life, and so unfit them for their struggle with a matter-of-fact world. They breed folly in weak minds, and awaken longings which can never be gratified, and so produce a state of chronic unrest.

3. **Bias.**—The wicked uncle, the unkind stepmother, and the well-specified characters of fairy life, often transmit a strong bias against their supposed prototypes in real life.

4. **Superfluous.**—We now have a rich literature, actually and potentially, and whatever might have been said in their favour in early days is of much less value now.

5. **Superstition.**—They appeared in a more ignorant and a more superstitious age than the present. They were written for a superstitious people, and were based on superstition, and are therefore very unsuitable for the present enlightened age.

RECITATION.

Recitation is a great aid to a good vocal delivery and intelligent reading. Here the mechanical difficulties are at a minimum, and almost the whole attention can be concentrated on the intelligent rendering of the passage. Really good reading is not the gift of the many, for it makes considerable physical and mental demands upon pupils. Those demands can be partly met, with the assistance of other aids, by good practice in recitation, which assists in developing the requisite qualities.

I. Physical Qualities.

- (a) **Confidence.**—Many pupils are afraid of their own voices when reciting, or they are ignorant of their own capabilities. Recitation removes the one and reveals the other where it exists. From reciting in chorus the pupil gains sufficient confidence to recite alone.
- (b) **Vocal Delivery.**—A thorough control of the vocal organs is required for good recitation, and practice will help to give this. Clearness, distinctness, well-pitched tone, with good articulation and varying cadence, are absolutely essential qualities of the voice for creditable work of this kind.
- (c) **Strength.**—Exercise strengthens faculty. A weak, piping voice, a bull-throated larynx—both are obstacles. The one needs strength to develop it, the other practice to restrain it. Varying demands are often made upon the physical capabilities in rendering recitation in the higher classes; the range may vary, from the impassioned utterance to the gentlest whisper.

II. Mental Qualities.

- (a) **Intelligence.**—The pupil may be drilled to repeat certain sounds at a certain pitch, but if there is no intelligence the audience is soon aware of the fact. The pupil must understand what he is saying, and he must give expression to that understanding by voice (and gesture sometimes).
- (b) **Soul.**—It is a fine means for cultivating the soul or finer feelings. It is an antidote to that metallic vocalism which chills. Teach the pupils to enter into the feelings, the sentiments of the piece, and to translate those feelings into their voices. All this can be done by recitation, for the amount is limited, and there is time for plenty of explanation, pattern work, and repetition. The correct rendering of the piece by the teacher throws a flood of light upon the sentiments expressed in the extract.

III. Advantages.—These are not confined to reading only.

- (a) It improves the **taste** by forming acquaintance with the choice portions of some of our choice authors.

- (b) It cultivates the **imagination**, for poetry is a great field for imagination. The power of picturing what has never been seen but only described is of the utmost value to education.

As the fancy often requires restraining it must be guided, and this is one of the methods of doing it. In other cases it requires stimulating; but in all cases the natural laws of its operation must be followed. For this purpose the pieces selected for recitation should be graded.

- (c) It widens the scholar's mind by giving him new thoughts.
 (d) It improves the power of **composition** by giving him the best models for imitation, and by storing specimens in his memory.
 (e) It has already been shown to improve the style of the **reading**.

IV. Pieces Suitable for Recitation.

Standard.	Title of Piece.	Author's Name.	No. of Lines.
I.	The Loss of the <i>Royal George</i> - - - - -	Cowper.	36
	The Soldier's Dream - - - - -	Campbell.	24
	The Death of the Flowers - - - - -	Bryant.	30
	I Remember, I Remember - - - - -	Hood.	32
	The Voice of Spring - - - - -	Howitt.	24
	The Child's First Grief - - - - -	Hemans.	28
II.	The Shepherd in Winter - - - - -	Scott.	43
	Casabianca - - - - -	Hemans.	40
	Dickens in Camp - - - - -	Bret Harte.	40
	Bruce and the Spider - - - - -	Cook.	44
	Lord Ullin's Daughter - - - - -	Campbell.	56
	Hector and Andromache - - - - -	Pope.	54
III.	The Cloud - - - - -	Shelley.	66
	We are Seven - - - - -	Wordsworth.	65
	Ode to the North-East Wind - - - - -	C. Kingsley.	68
	Lucy Gray - - - - -	Wordsworth.	64
	The Battle of Blenheim - - - - -	Southey.	66
	Ye Mariners of England - - - - -	Campbell.	64
IV.	Brave Lord Willoughby - - - - -	Old Ballad.	88
	The Night before Waterloo - - - - -	Byron.	84
	To a Skylark - - - - -	Shelley.	94
	The Wreck of the <i>Hesperus</i> - - - - -	Longfellow.	88
	The Shipwreck - - - - -	Byron.	84
	The Slave's Dream - - - - -	Longfellow.	80
V.	The Battle of Agincourt - - - - -	Drayton.	120
	Horatius - - - - -	Macaulay.	103
	On the Receipt of my Mother's Picture - - - - -	Cowper.	121
	Ode on a Distant Prospect of Eton College - - - - -	Gray.	100
	Elegy Written in a Country Churchyard - - - - -	Gray.	128
	Nanhaught the Deacon - - - - -	Whittier.	107
VI. and VII.	L'Allegro - - - - -	Milton.	152
	Il Penseroso - - - - -	Milton.	176
	Mark Antony's Speech - - - - -	Shakespeare.	156
	Brutus and Cassius - - - - -	Shakespeare.	151
	Hubert and Arthur - - - - -	Shakespeare.	150
	Henry VIII.—Fall of Wolsey - - - - -	Shakespeare.	154

EXAMINATION QUESTIONS.

- 1.—What is meant by *simultaneous* reading? How should it be conducted, and what is the use of it?
- 2.—What is meant by *tone, accent, emphasis, and expression* in reading? Say why they need special attention, and how you can best deal with them.
- 3.—Say what sort of reading lessons you have found most interesting to young children, and describe the way in which you would try to secure *distinct articulation*.
- 4.—Name a few words which are specially difficult for young children to read owing to the presence of *silent* letters.
- 5.—What is meant by *distinct articulation* in reading? Name any words which present special difficulty to learners, and mention any form of exercise that is most useful in correcting faulty articulation.
- 6.—Explain the use which a teacher should make of simultaneous and of pattern reading, and say what objection (if any) there is to an excessive use of either method.
- 7.—In teaching the elements of reading to young children, say whether it is better to begin with little words and afterwards call attention to the letters, or to begin with the alphabet and afterwards make up simple words. Give your reasons.
- 8.—Give explanations (brief) of any difficulties in the following passage, proposed as a reading lesson to scholars in the Second Standard:—
 "Who is this that cometh from the south, thinly clad in a light transparent garment? Her breath is hot and sultry; she seeks the refreshment of the cool shade; she seeks the crystal brook to bathe her languid limbs. The tanned hay-makers welcome her coming, and the sheep-shearer, who clips the fleeces of his flock with his sounding shears."
- 9.—What are the chief difficulties to be encountered in teaching infants to read? Detail the apparatus required for children below seven years of age.
- 10.—Detail some of the advantages and disadvantages of teaching reading by the alphabetic method.
- 11.—Write out some sentences containing five or six words which would present difficulties to each of the three lowest standards, and explain the progressive character of your method.
- 12.—What preparation should be made by a young pupil teacher before giving a reading lesson to a lower class, both as regards the language and the matter of the lesson?
- 13.—In the following sentence explain the peculiar difficulties presented by the words in italics in the early stages of reading:—
 "He would take no *pains to teach any boy who* could not at least *write what boys of eight years old can write*."
- 14.—What especial care would you bestow upon the less advanced readers in your class before, during, or after a reading lesson? How can home lessons be utilised for teaching reading?
- 15.—What should be the next steps in reading after a child has mastered the forms of the letters and powers of the vowels? Give examples of a few such lessons.
- 16.—Explain how the reading of dialogue and recitation may be employed to remedy want of intelligence in reading. For what reasons should more than one set of reading books be employed in each class?
- 17.—Which subjects of instruction can be best taught by reading books, and which by oral lessons? Give reasons in each case for your classification.
- 18.—Name some of the qualities of good reading.
- 19.—What special help should be given to an older child backward in reading, to obviate his being placed in a class of younger children? What harm would it do a child to be so placed?
- 20.—Give some rules which you intend to follow for securing (1) distinct articulation; (2) intelligent expression in reading.
- 21.—What are the commonest faults which you have found in the reading of children? How would you correct these faults?
- 22.—It is sometimes complained that children do not read well because their reading lessons are constantly interrupted by the oral spelling of the more difficult words. Do you consider such interruption necessary, and, if not, how may good spelling be attained without it?
- 23.—Explain what may be done by the help of reading books to impart geographical and historical information in schools in which geography and history are not taken as class subjects.
- 24.—Name some poetical pieces or extracts suited for recitation in any three of the classes, either in an infant school or in a school of older children, and say what is the use of memory exercises of this kind.
- 25.—What is meant by style and expression in reading, and how can they best be taught?
- 26.—What is the best way of arranging a class for a reading lesson so as to secure (a) distinctness of utterance, and (b) readiness on the part of the scholars to observe and correct mistakes?

27.—It is said that some children know their reading books almost by heart, and that when examined they are only reciting, not reading. How could you detect this fault, and by what means could you guard against it?

28.—What is the use of pattern reading in teaching a class to read? Mention any common faults which a good teacher should avoid in giving such lessons.

29.—Explain what is the best use to make of a box of movable letters in an infant class.

30.—Describe a plan followed in your school in beginning to teach the youngest children to read.

31.—Point out the silent letters in "light," "height," "which," "colour," "tremble".

32.—What are the advantages and disadvantages of simultaneous reading, and when and how should the practice be adopted?

33.—What are the chief points to be kept in view in teaching the art of reading? Name the advantages, if any, of exercises in silent reading in school.

CHAPTER X.

SPELLING.

SPELLING is one of the most difficult branches of school education. Children learn to spell correctly with difficulty, and forget what they have learnt with ease; they spend years in acquiring, and little more than weeks in forgetting. Some never spell correctly at all; and absolutely correct spelling is anything but a general accomplishment, even among educated people. The subject is one mass of anomalies, and the national waste in acquiring such a system is beyond computation. In company with our cumbrous system of compound rules in arithmetic, it handicaps our youth heavily in the educational race, and prevents very valuable time being spent in a much more productive manner. Attempts have been made to introduce systems of phonetic spelling, but with no success at present. The spread of phonography or shorthand may yet have a big influence in modifying our spelling into something easier, especially if it should ever become generally taught. The objections to change rest on mighty bases which will require much to move them. The habits of the people, their reluctance to face the labour of a change, the opposition of the printing trade, the great loss of capital involved, and the destruction of the historic evidence contained on the faces of the words themselves, will always be obstacles to change, however desirable some may think it. In a language so arbitrary as ours, spelling must always be a difficulty, hence the teacher needs to study the best ways and means of teaching the subject.

Ways of Teaching Spelling.

1. The Reading Lesson.

- (a) Spelling is a matter for the *eye*. Reading gives plenty of practice to the eye, and the recurrence of word pictures fixes them in the memory through the eye.
- (b) *Formal spelling* forms a part of many reading lessons. The *eye*, the *ear*, and the *voice* all unite to fix word impressions,

2. Lists of Words.—These are sometimes given as home work. The words are generally selected from the school reading books, and this method has practically supplanted the use of the old spelling book. The *meaning* should always be given, as it brings *intelligence* and *interest* to bear on the work. The old spelling books were often published with meanings, but as explanation was the exception probably, and not the rule, the meanings were of little use, often being mere synonyms or being expressed in language as obscure or meaningless as the word itself. The words should be *grouped* (and this could be done in several ways), which would bring *variety*—another essential for interest; *e.g.* :—

1. Like combinations and unlike sounds } Irregular.
2. Like sounds and unlike combinations }
3. Like sounds and like combinations—Regular or phonetic.

As an example, take the words **rough, should, which, many.**

Rough.—This word is made the basis for grouping a large number of words, to which the principles of **comparison** and **contrast** are applied; *e.g.* :—

Rough is *compared* with Tough, ruff, puff, buff, stuff, etc.
 „ *contrasted* „ Cough, off, north, broth, etc.
 „ „ Dough, although, low, know, etc.
 „ „ Bough, plough, sough, cow, etc.
 „ „ Through, hew, knew, hue, Jew, etc.

Should is *compared* with Could, would, wood, hood, good, etc.
 „ *contrasted* „ Boulder, moulder, ghoul, soul, etc.

Which is *compared* with Witch, rich, ditch, hitch, pitch, etc.
 „ *contrasted* „ Greenwich, Woolwich.

Many is *compared* with Any, penny, jenny, fenny.
 „ *contrasted* „ Company, manifold, manly.

3. Transcription.—See notes on Transcription.

4. Dictation.—See notes on Dictation.

5. Formal Spelling Lessons.—These are still given in some schools. They are profitable, for they admit of *graded* systematic teaching. Generally, however, they are preliminaries to some other lesson like reading or dictation. The teacher's chief task for success is to make such lessons interesting, and this must be done by classification, suitable explanation, mark giving or place taking, and by a bright, sympathetic manner in questioning.

6. General Work.—Spelling enters into most of the general work of the school. It is a chronic difficulty, and requires continuous teaching and practice. Whenever and wherever a spelling error occurs, as a rule, then and there it should be corrected.

7. Composition.—This affords a good test of spelling, which is generally worse in composition than in other lessons. The divided attention demanded by the subject probably accounts for this. *Word building* is a good exercise, both for spelling, composition, and grammar. A sample syllabic combination can be taken, and words can be built from it; *e.g.* :—

-at	c-at	sc-at	sc-at-ter	scat-ter-ed
-at	p-at	sp-at	sp-at-u	sp-at-u-la
not	-with	-stand	-ing	
new	-er	-the	-less, and so on.	

8. Observation.—Childish curiosity and activity show themselves in the reading of miscellaneous matter like shop names and advertisements. Encourage it, for it is a good aid.

9. Literature.—Easy story books, fables, and childish literature generally are more or less now within the reach of most children, and the reading of these aids spelling. School libraries assist older scholars, but they make no provision for younger scholars.

10. Spelling Contests.—These were in great fashion as “Spelling Bees” a few years since; and although they have dropped out of public favour, there is no reason why they should not be maintained in the school. They stimulate emulation and effort, and that desire for success which can only be obtained by constant preparation.

Faults in the Teaching of Spelling.

1. The *ear* and the *tongue* are appealed to rather than the *eye*. Both should be used, but there should be *observation* as well as *repetition*. The deaf and dumb generally spell correctly, and this is some evidence as to the value of the eye. Then the *visual or pictorial memory* is stronger in most people than the *verbal*, hence the eye should be used more than the tongue and the ear. Spelling is essentially a matter for the eye, for, after all, it is nothing more nor less than the mastery of form; but the tongue and the ear can be brought in as aids to strengthen the associative links.
2. *Lists of disconnected isolated words are given* to be learnt, whereas they should be chosen from lessons done or to be done.
3. The number of syllables is generally the only basis of *classification*. This is not scientific. The words should be grouped, and plenty of use made of contrast and comparison.
4. The *meanings* of words should always be given, not in set definitions, but in suitable explanation, so that each word may as far as possible become notional to the class. The meanings, when required, are too often overlooked or neglected.
5. *Dictation should always be prepared* in the lower classes, so that the right form may be first learned, and then there will be nothing to unlearn. Teachers are often too anxious to *test* by dictation before they have prepared by spelling or transcription.
6. More use should be made of *composition* exercises. It has already been pointed out that spelling is often worse in composition than in other spelling exercises, and it generally reveals many of the special weaknesses of each pupil. The teacher then knows where to concentrate his work.
7. There should be lessons in *word building*. It is a good phonetic and synthetic exercise, and it gives confidence to the children, and so helps to check that demoralisation which often attacks young scholars when they are undergoing repeated shocks of spelling anomalies.
8. There is often an absence of *incidental aids* like phrase spelling, classified spellings, and spelling bees. All of these have their use and their value, and they should not be neglected.
9. Spellings are sometimes taught at the *wrong time*, although such times must be very rare. But to obtrude the spelling of a word when the class is deeply interested in some experiment, illustration, or description, is to attempt the right thing at the wrong time.

Difficulties in Spelling.

Our anomalous and defective alphabet is the chief source of these difficulties. Mr. Gill in his *School Method* emphasises this fact by showing that ten selected letters have thirty-eight sounds, and furthermore that seventeen sounds have ninety-eight different ways of representing them. These are the difficulties of beginners.

I. Higher Classes.—The thorough and successful teacher will always make sufficient preparation for all lessons where preparation is necessary; and so in spelling preparatory observations should be made as to its difficulties before proceeding to write from dictation. The words must not only be learnt, but the difficulties as they exist in each word must be pointed out and

compared with similar syllables and similar sounds. These difficulties, from their very nature, need *frequent* rather than *prolonged* attention. Spelling is a memory exercise, so that there must be repetition, concentration, and interest, for without these memory is weak. To make a spelling lesson interesting requires some skill and preparation. Furthermore, the class should thoroughly understand the piece; hence, where necessary, words should be explained. The following fragment might be taken as an example:—

II. Preparation for Class.

A. Subject Matter.—"The *watery dykes* display *luxuriant verdure*; *bulrushes* and *waterflags* have attained their freshness; willows are rich with *foliage* in *sylvan* nooks; *agreeably* hidden in a leafy *arbour* you may catch glimpses of the retiring *denizens* of the more secluded *labyrinths* of the forests" (1883).

1. Have the piece *read simultaneously*, and then by several scholars individually, either from the B.B. or books.
2. *Underline the difficult words* after having written the piece on the B.B. The piece should have been, previous to the lesson, already written on the B.B.
3. Now *group* the words as far as possible, and deal with them both as to spelling and meaning *seriatim*.

B. Words.

1. **Watery, agreeably, leafy.** Note the *y* sound in each word, -y, -ly, -y. Compare with -ie, -ey, -ee, -ea, -i (*foliage*). Explain the words, and then have them learnt.
2. **Luxuriant, bulrushes, secluded.** Call attention to the different sounds of the -u. Explain words, and have them learnt. Previously a specimen or picture of a bulrush might have been shown. *Bul* (syllable) should be compared with *bull* (a complete word). *Se* might be compared with *sea, see, -cet*.
3. **Sylvan, dykes, labyrinth.** Note the *y* sound again, and contrast with 1. Explain the words, and have them learnt. Sketch or show a picture of a *dyke*. *Derivations* may be given in many cases to an advanced class, especially if they throw any light upon the history of the words and their changes of meanings.
4. **Attained.** Compare pain, gain, Cain, lain, drain, stain, etc. Contrast mane, pane, rein, reign, deign, bane, etc.
5. **Denizens.** A phonetic word. Explain the meaning, and have the spelling learnt.
6. The words might now be rapidly recapitulated in their spelling, and the class will then be ready for the dictation or reading.

III. Lower Classes.—With younger children the method pursued should be somewhat different. Take the following piece for children in the Second Standard:—

A. Subject Matter.—"The *tiger's tongue* is so *rough* that if it were to lick your hand it *would* cause *blood* to *flow*; its *colour* is a

light *tawny brown* with *beautiful black stripes*; its feet are *cushioned*, and it has *whiskers* to help it feel its way" (1880).

B. Words.

1. **Tiger's.** Here the apostrophe is the difficulty. Show that it denotes possession; convert to "the tongue of the tiger"; note that it is singular, and contrast with the plural form (tigers').
2. **Tongue.** The letters *ue* are silent; the *o* has a *u* sound, hence the word is pronounced *tung*. Compare with *rung*, *sung*, *hung*, *bung*, *dung*.
3. **Rough.** The most tiresome syllable in the English language. See "Ways of Teaching Spelling".
4. **Would.** Compare with *could* and *should*—silent *l*; and contrast with *wood*, *hood*, *good*.
5. **Blood.** The *-oo* has the sound of *u* (= blüd). Contrast with *hood*, *wood*, *good*; and compare with *mud*, *stud*, *spud*.
6. **Flow and brown.** Note the difference of the *-ow* sound in the two words. Compare *flow* with *know*, *sow*, *stow*, *throw*, etc., and *brown* with *cow*, *row*, *now*.
7. **Colour.** Silent *u*. Compare with *parlour*, *governour*, *labour*; explain that these words are now sometimes spelt without the *u*, as in *color*, *labor*.
8. **Tawny.** Compare *tawn-y* with *lawn*, *pawn*, *dawn*, and contrast with *corn*, *morn*, *for-lorn*.
9. **Beautiful.** Explain *beau*, and have it spelled. Point out the difference in spelling between *full* (word) and *ful* (suffix).
10. **Cushioned.** Its length, strangeness, the *i*, and the pronunciation would constitute its difficulties here. The first part of the word could be compared with *push*, and contrasted with *lush* and *rush*. But the meaning having been given, repetition and writing will be the best means of learning this word.
11. **Whiskers.** The O.E. *wh* (*hw*) is the difficulty here probably. The regular observance of the proper pronunciation of *who*, *which*, *what*, *when*, *where*, and *why* would make this difficulty easy.
12. Finally the words should be written on the B.B.; the class should be allowed to learn them, and subsequently they should be dictated in the piece of composition to which they belong. The errors (if any) should then be dealt with and learned.

The Classification of Difficult Words.

The *Teachers' Monthly* in the November number of 1893 contained the following list of 200 words (which were adjudged the best of a number of lists submitted) as being typical of the errors that are most likely to occur in the dictation exercises of Standard III. The list was furnished by Mr. Mitchell, Schoolhouse, Ferry-side, Carmarthenshire, and the classification is a very good one.

I. Tendency to omit letters.

beginning	beautiful	woollen	address	shepherd
safety	kingdom	slippery	compelled	agreeable
success	swimming	biggest	hottest	except
carriage	ascend	generally	opposite	immediate
marriage	descend	stretching	possess	whiteness
traveller	disappoint	fourth	temptation	quarrelling
account	government	forgetting	likeness	forgiveness
difficult	addition	thinner	safely	redder
convenient	occasion	daisies	particular	occurred
pleasant	useful	surprised	accustom	suppose
afford	jealous	really	getting	dessert

II. Tendency to insert letters not required.

bur()ied	until()	tig()ress	wel()come	lin()en
wis()dom	wood()en	al()most	pas()time	nec(essary
sub()traction	hund()reds	umb()rella()	grie()vous	deli()ver
quarrel()some	oblig()ing	im()age	per()il	ful()fill()
wel()fare	mis()taken	im()agine	tres()pass	skil()ful()
al()ways	travel()	ex()ercise	shin()ing	pre()sently
drown()ed	tru()ly	al()ready	bal()ance	us()ing

III. Tendency to mistake vowels.

business	grammar	separate	divide	pursue
governor	cotton	standard	visible	surface
purchase	doctor	system	scholar	persuade
sensible	basin	leisure	destroy	figures
sailor	sugar	manners	different	regular

IV. Tendency to mistake consonants.

nephew	medicine	clothes	picture	{ profit
monarch	duchess	conceal	expense	{ prophet
anchor	accident	grocer	physic	{ practise
certainly	accept	chimney	razor	{ practice

V. Tendency to reverse order (el, le, ol).

believe	pieces	receive	violent	mischief
relieve	siege	conceive	violet	grief
niece	seize	thieves	friendship	fiery
series				

VI. Silent letters.

knowledge	neighbour	knitting	cupboard	solemn
ploughing	unwholesome	scenery	knocking	autumn
islet	climbing	roughly	doubtfully	column
foreign	answer	wrought	kiln	tombstone
indebted	sovereign	naughty	although	dough

VII. Miscellaneous.

{ current	{ course	{ whether	{ rowed	advise
{ currant	{ coarse	{ weather	{ rode	advice
fatigue	view	{ wether	{ road	error
plateau	colonel	scythe	stomach	patience
tight	wreck		des()ert	valleys

Rules for Spelling.

If the teacher should decide to give formal spelling lessons in school, or to supply lists of words for home work, he might make use of the rules of spelling which have been ably formed by Professor Meiklejohn in his new spelling book. In such cases the rule should first be learned inductively. Plenty of examples should be given, and from these the rule should be discovered and given. Then the lists of words might be committed to memory. But there are two primary objections to such lessons. Spelling is usually learned as a preparation for some other lesson, and the choice of words will necessarily be limited by the subject matter of that lesson. This would necessitate the introduction of a number of strange (to the lesson) words for the purpose of discovering the rule, or the rules will only be capable of partial application; and, secondly, the number of exceptions is so large as to make the total result sometimes confusing. Perhaps the

best way to solve the difficulty would be to have a number of formal spelling lessons, and then in such cases as preparation for dictation, or in the correction of spelling errors, each case could be brought under its own rule at once. That is, for the correction of errors, the rule should be applied deductively. One or two rules are given here as types, but the student could form others for himself, or he could get a copy of the book referred to, where he will find all that he wants.

1. When the vowels *ei* and *ie* have the sound of *ee*, *ei* follows *c*, but *ie* all other consonants.

When *e* and *i*, or *i* and *e* are sounded like the *e* in *me*.

After all consonants but *c* the *i* must go before the *e*.

Exceptions: financier, plebeian, seize, weird.

If the diphthong has any other sound than *ee*, the order of the letters is always *ei*.

2. A final *y* is changed into *i* when a syllable is added, unless—

(a) The affix begins with *i*, as *ing, ish, ist*.

(b) The *y* is preceded by a vowel.

Exceptions: dryness, shyness, etc.; shyly, daily, gaiety, gaily, laid, plaid, said, slain.

3. The final *e* of a word is retained when a syllable beginning with a consonant is added, but dropped if the affix begins with a vowel.

Exceptions: abridgment, acknowledgment, argument, awful, duly, judgment, lodgment, truly, wholly, woful, etc.

Transcription.

I. Its Functions.

1. **To Teach Spelling.** This is its primary function, and it does it in a natural way—through the eye. If followed by spelling orally and dictation, the words become permanently fixed.
2. **Practice in Writing.** Care and attention can be given to the writing, although this is a subordinate object of the lesson.
3. **Style.** If the pieces are well chosen, some of the pupils may be gradually leavened with the style of the author; but it is feared that, as a rule, the exercise becomes too mechanical to have much influence of that kind.
4. **Grammar.** The frequent transcription of correct forms of speech tends to the use of correct language, and this, too, in an easy way.
5. **Punctuation.** What has been said of grammar is equally true of punctuation, which is always a difficulty with scholars.
6. **Discipline.** It engenders habits of carefulness, for it demands minute inspection for accuracy, and for this reason it is not an easy exercise. Furthermore, the sentiments expressed in the subject matter, and slowly transcribed by the pupil, have better opportunities (from their brevity, and the comparative leisure offered for their comprehension) of fixing themselves in the minds of the scholars.

II. Its Conditions.

1. The *subject matter* must be understood by the children.
2. All *errors* must be carefully corrected, and the corrections learned.
3. The *time* for the lesson will vary. In the lower classes it should follow a reading lesson, in which the subject matter has been read and explained. In the higher classes it can be used with more freedom. Its best use will be as a preparation for dictation.

III. Subject Matter.—In the early stages, the pieces will be chosen principally with a view to the maximum advantages in spelling, and with a due regard to the handwriting. But when the handwriting is well formed, the teacher can then select passages without any particular attention to the writing. He can then concentrate the attention on the—

1. Difficulties of orthography or derivation; or upon the
2. Difficulties of style; or upon the
3. Difficulties of grammar.

In such cases the lesson will be something more than a mere aid to spelling; it will become an instrument of culture, by elevating the style or the thoughts, or by enriching the expressive vocabulary of the pupils.

Dictation.

I. Its Function.—This is one of the methods of teaching spelling and composition. It teaches spelling indirectly and composition directly. The chief aim of a dictation lesson should be to *prevent*, not to *correct* mistakes. For this reason it is necessary that it should usually be preceded by some kind of preparation, so that its real office becomes a *testing* rather than a *teaching* one.

II. Subject Matter.

1. **Suitability.** The subject matter must be suitable to the capacities of the children. The thoughts and language should be within the grasp of their comprehension, and the limit should be kept within a little explanation from the teacher.
2. **Preparation.** It must be prepared in most cases. For young pupils to write unseen is to learn to write mistakes. Unseens are tests only, and our difficult system of spelling makes preparation absolutely essential.
3. **Quantity.** Long pieces may be a test of physical endurance, or of juvenile hard-headedness; but they can scarcely claim to be safe tests either of knowledge or intelligence, for the strain is too great for some pupils. It is not the *quantity dictated*, but the *amount corrected* which has the educational value. The amount will grow with the growing power of retaining phrases in the mind.
4. **Teacher.** The teacher must dictate the words once only. The disciplinary effect of this is great. He should previously read the passage through in a clear, deliberate voice, especially if the piece is a test. But he must never forget that distinct speech is no substitute for preparation.

III. Correction.—The methods of correction will generally depend upon the quantity and quality of the staff. There are four principal methods in use.

1. **Individual Correction by the Teacher.**—This is the best method, but certain objections are alleged against it.

- (a) It is too expensive in time to be done *in* school hours.
- (b) It is unjust to expect a teacher to do it *out* of school hours as a rule.

Such methods of correction should be the exception and not the rule.

2. Monitorial Correction.—In some schools monitors or curators are selected to examine the work. It is an office of trust and responsibility, and so becomes an aid to diligence and progress. But this, like all other methods, is open to *objections*.

- (a) It is unfair to the monitors. It is a wearying task; and unless special arrangements are made for the adequate instruction of the monitors, they lose their own lessons.
- (b) If the monitors are paid this objection disappears, but even then there is a very poor return for so much fagging work.
- (c) It involves implicit trust in the monitors. The monitor, remembering his tender years, may prove unreliable from some cause or other.
- (d) The monitor, from fatigue, or indifference, or a weak sense of duty, may correct carelessly.
- (e) Monitorial correction may breed ill-feeling in the class.

3. Inter-Correction.—This is the method usually adopted. The children change slates or books, and correct each other's work. They are thus revising the lesson and correcting at the same time. The method is open to *serious objections*.

- (a) It tends to collusion between scholars to mark work dishonestly.
- (b) It gives opportunities for the display of petty spite, malice, revenge, etc., in the incorrect marking of exercises.
- (c) It leads to disputes, bad feeling, and disorder. Children are prepared to dispute the marking of a fellow-pupil.

4. Self-Correction.—This method allows the class to correct their own work at the dictation of the teacher. It is the same process of correction as 3, with the exception that each pupil marks his own books. Its *objections* are:—

- (a) It places too great a strain upon the moral strength of some of the pupils. There are more moral weaklings than either physical or mental ones, and it is unwise and unjust to set many a moral task beyond their moral strength.
- (b) The primary object of correction is usually defeated—the *throwing up boldly* of all errors. There is too much self-tenderness with this method. Errors are either passed over, or else marked so faintly or so minutely as almost to escape attention.

IV. The Moral Side of Correction.—All correction should be done with the greatest care, and in a reasonable period of time. Books should rarely be kept more than a day or two. **The careless correction of errors produces a whole crop of evils**, some of the chief of which are as follows:—

1. A habit of **carelessness** is bred in the pupils. They become untidy in their methods, their lessons, and sometimes in their habits generally.
2. **Deceit** is engendered. The pupil is induced to cheat, because there is less probability of detection.
3. It would cause **laziness** and probably **indifference**, for where a lack of care, and by inference a lack of interest are shown by the teacher, the infection will soon spread to the scholars and develop into laziness.
4. **It increases the difficulties of school work.** The pupil will cease to respect the teacher, and so discipline and teaching will become harder. This may lead to **increased severity** or increased carelessness on the part of the teacher.
5. The **tone** of the school will **deteriorate**. A careless teacher puts himself on an inclined plane, and the rate of his descent increases. **In-**

- difference, untidiness, laziness, cheating, untruthfulness, loss of respect, all may arise from the careless correction of work.
6. It is **unjust to the pupils**. Each error is like a signpost guiding the direction of the teaching, for errors indicate the individual wants of the pupils. If these errors are carelessly treated, the child is deprived of that attention and training which it has a right to expect, and which it is just as rightly expected the teacher will give him.
 7. It is **wasteful**, for much time, interest, power, and zeal are lost.

NOTES ON A DICTATION LESSON.

(Class— Standard III. Time—30 minutes.)

I. Class Arrangement.

1. Arrange the class as widely apart as the desk space will allow.
 2. See that the ink wells have been properly filled.
 3. Have the dictation books and pens given out.
- This is best done by placing the required number at the end of each row, and by having them passed upon the sign or command of the teacher.
- Dictation books* should be used—not pieces of paper. The book then becomes a *register of progress both in handwriting and spelling*. When filled, these books should be preserved by the teacher, for they allow him to collect and classify all the commonest spelling errors of the class, and so to arrange his future lessons to meet these recurring errors. He should not burden his lessons with words of rare occurrence.

II. Class Preparation.

1. The piece may have been previously prepared either—
 - (a) In the Reading Lesson.
 - (b) In the Transcription Lesson.
 - (c) In a Spelling Lesson.
 - (d) In Special Class Work.
 - (e) In Composition Exercises.
 - (f) In Home Work.
2. If not, write the following words on the B.B., and have them learnt :—
Curfew, Tolls, Knell, Lowing, Lea, Ploughman, Weary, Glimmering, Landscape, Drowsy, etc.
 Have them spelt *simultaneously* and then *individually*.
3. Or have the piece previously written upon the B.B., underline the most difficult words, and turn the B.B. to the class so that the words may be learned. This is a good method, as the teacher cannot successfully anticipate the difficulties of every boy, whilst this method allows each boy to run through and select his own difficulties.

III. Dictation.—Read the passage through slowly and distinctly *once* ; then dictate in phrases, samples of which are marked below :—

The curfew tolls | the knell of parting day ; |
 The lowing herd | winds slowly | o'er the lea ; |
 The ploughman homeward plods | his weary way, |
 And leaves the world | to darkness and to me. |

IV. Correction.

1. Change books ; vary the method, sometimes with the boy in front, sometimes with the one behind ; to the right, to the left ; the end boy on the right hand of each row to pass his book to the left-hand boy of his row, and then return to his place. Then pass the rest of the books one place to the right.

2. (a) Spell the passage through distinctly, and have each misspelt word *marked through* in each book. The total number of errors should be put at the end of the exercise. If the word is underlined it allows more chance of alteration and consequent dispute. Marking through prevents this.
- (b) Or let them correct from their reading books, if the piece be taken from a reading book. In this case the right number of books should have been previously placed at the end of each row, and when the books have been exchanged, upon the sign of the teacher the books should be passed and the page announced.
- (c) Or it can be corrected by having the piece previously written on the B.B. Everything is then ready (see No. 3 under Class Preparation).
3. Books to be changed back to their owners.
4. Now write the most difficult words on the B.B. Methods (b) and (c) avoid this waste of time.
5. Have the errors carefully written under the exercise, learned, and repeated to the teacher, who is moving quietly about the class hearing mistakes spelt, inspecting books, and marking the exercises. If the class is very large, one or two of the best pupils might be called upon to assist.

V. Conclusion.—The dictation books and reading books (if used) to be passed to the ends of the desks; the pens also should be passed unless required for the next lesson.

EXAMINATION QUESTIONS.

- 1.—Name eight words in the spelling of which young children often make mistakes, and explain by what sort of exercises such mistakes may be corrected or avoided.
- 2.—Take the following words, and give a list of others which might be grouped with them for a spelling lesson: *rough, should, which, many, taught*.
- 3.—What preparatory observations as to difficulties of spelling should be made before proceeding to write from dictation the following passage?—
"The watery dykes display luxuriant verdure; bulrushes and water-flags have attained their freshness; willows are rich with foliage in sylvan nooks; agreeably hidden in a leafy arbour you may catch glimpses of the retiring denizens of the more secluded labyrinths of the forests".
- 4.—Distinguish the uses of dictation and transcription lessons for children lately transferred from an infant school.
- 5.—Show that some words would present special difficulties of spelling in the following passage, dictated to children who had not passed the Second Standard:—
"The tiger's tongue is so rough, that if it were to lick your hand it would cause blood to flow; its colour is a light tawny brown, with beautiful black stripes; its feet are cushioned, and it has whiskers to help it feel its way".
- 6.—Before giving out a passage for dictation, what preparation is needed to prevent possible misspellings?
- 7.—Describe the various methods used to teach spelling in your school. Did you rely chiefly on the eye or on the ear in teaching spelling?
- 8.—Give some (not more than six) of the commonest misspellings of children in the First Standard, and account for each natural confusion in spelling. How did you correct written exercises in spelling?
- 9.—How have you been accustomed to give a dictation lesson? How was the exercise corrected? What expedients were adopted to prevent copying?
- 10.—How would you conduct a dictation lesson to the Third Standard? How should the mistakes be corrected?
- 11.—Mention any twelve words, the spelling of which presents special difficulty to young learners; and say by what sort of exercises you can best help such learners to spell them correctly.
- 12.—What points would you chiefly keep in view in giving a dictation lesson?
- 13.—Name some of the commonest faults of young assistants in teaching spelling. How much of a spelling exercise should be oral, and how much should be written?

CHAPTER XI.

WRITING.

WRITING is important and valuable both for its practical worth and its aid to training. It is a recognised and essential means of communication in private life. It bridges distance, and brings the absent within the range of conversation. Its business importance is too obvious to need comment. Professionally it may generally be taken to indicate the character of the school and its work. It appeals easily and readily to the parents as an index of the progress of their children; a just pride is bred, which reacts favourably on the school reputation, and consequently upon its attendance. Nor is its literary value less. Before the invention of printing all books were written, and they still have to be written, although they are given to the world in a printed form. But the literature of a country is dependent upon writing for its existence and growth. Shorthand is a form of writing with a new set of symbols. Nevertheless, it is writing, and a very important development of it too. Its importance is recognised by the Code and our schools in a practical way; and for journalism, office work, and secretarial duties, it is now almost absolutely essential.

Nor are the training advantages of writing to be overlooked. Without being what is understood as an intellectual subject, it nevertheless affords some training, both mental and moral. The careful and successful writer is taught to *observe* form and proportion closely, to note those small details which give quality and style to the writing. The *memory* is exercised in the earlier stages in remembering the items observed, although little memory training can be claimed for what is almost purely an *imitative* exercise. There is more training for the *attention* if the lessons are properly supervised and carried on, whilst the *judgment* is cultivated by the study of spacing, slopes, and proportion. The *artistic* value of writing must also be recognised, for it is a

correlative to drawing, and it develops the sense of beauty and proportion.

Writing is not without its moral advantages. It induces habits of neatness, care, and accuracy, which help to leaven the whole character.

Position for Writing.—As writing is a mechanical acquirement very largely, it is essential that the physical side of the subject should receive proper attention, so that no habits injurious to health may be formed. This will include the consideration of such things as the position of the body, the place of the slate or paper, light, the position of the ink, and the holding of the pen.

1. **Body.**—The body must be kept in an easy position, upright, and not leaning against the edge of the desk, but nearly as possible parallel with it. There should be no leaning either one way or the other, otherwise the weight of the body will not be evenly distributed on the seat. The pupil should not be allowed to bend over the work, nor to rest the head upon the left hand. (See notes on "Desks".)

2. **Slates, etc.**—The slate, copy-book, or paper should be parallel with the desk, but placed slightly to the right, so that the handle of the pen should point over the right shoulder.

3. **Light.**—If possible, this should fall from the left. (See notes on "Light".)

4. **Ink.**—This should be placed slightly to the right, so as not to necessitate a change of position.

5. **Holding the Pen.**

- (a) The pen will be held between the first two fingers on the one side, and the thumb on the other.
- (b) The two fingers and the thumb should all be bent—the thumb most so.
- (c) The forefinger should rest upon the top of the pen.
- (d) The hand should rest upon the last two fingers.
- (e) The pen should be held lightly, and should point towards the shoulder. Both sides should be equally pressed, but not clutched.
- (f) The pen should not be held too near the nib. If too near, the action is cramped, the writing often stiff, and the work more often dirty.
- (g) The arm should rest on the desk a little below the elbow.
- (h) The hand should not be supported by the wrist, or rapidity and quality will suffer.

MULHAUSER'S METHOD.


Mulhauser belonged to Geneva, and he prepared his system of writing at the request of the French Government. It was introduced into this country in 1840 by the Committee of Council on Education. He lays down certain *essentials* for good writing, which refer to the seat, the body, and the pen. The child was to be well seated, with its body in a healthy position, and the pen was to be properly held. His *theory* was that writing was to be an instructive as well as an imitative art. Experience has shown that the method, despite its complexity, is a good one.


Principles of Construction.


1. The elements and the letters themselves were to be taught in the order of their simplicity.
2. The pupil was to be furnished with a standard by which he could determine for himself the height, the breadth, the inclination, and the points of combination of the letters. This was to be done by his celebrated system of rhomboids.
3. Such instruction was to be given in the course of the lesson as would make the exercise an intelligent and interesting one.

Analysis of Movements.—Analysis is the teacher's work, synthesis the child's. Writing is effected by movements of the hand and arm. Analysing these movements, he found there were four of the hand—up, down, right, and left; and that the movement of the arm was lateral to the right, and that by it the symmetry, uniformity, and parallelism of the writing was to be maintained.

Analysis of Letters.—These are resolved into elements. Some say that there are but four; *e.g.* :—

(a) The **right line** down and up, as ;

(b) The **curve** down and up, as ;

(c) The **loop** down and up, as ;

(d) The **crotchet**, as in the .

But perhaps it will be better to divide them into eight elements.

(a) **Right Line.** This has four different heights, and it is the first principal element.

- (1) One height, as in *i*.
- (2) One and a half heights, as in *t*.
- (3) Two heights, as in *h*.
- (4) Two and a half heights, as in *p*.

(b) **Link.** This is the first connective element. It forms the latter part of the letters *i, e, t, m, n*, etc.

(c) **Hook.** This is the second connective element. It forms the first part of the letters *n, m, v, y*, etc.

(d) **Curve.** This is the second principal element. It is found in the letters *o, c*, and *e*.

(e) **Loop.** This is the third principal element; found in *e, y, g*.

(f) **Crotchet.** This is the fourth principal element, as in the latter parts of *r, v, b, w*.

(g) **Bar.** As in the *t*.

(h) **Dot.** As in the *i* and the *j*.

Method of Teaching.

1. **Mechanical Aids.**—As one aim of the system is to enable the pupil determine the proportion, inclination, and joinings of the elements and letters by a definite standard, he is furnished with books ruled in spaces the width and half the height of the letter *O*.

(a) **Terms.**

$\frac{1}{2}$ height = the vertical distance between two lines.

One space = the lateral " " "

One height = the vertical " " "

(b) **Letter Spacing.**

1 space = the width of *e*, *c*, *q*, etc.

2 spaces = " " *u*, *a*, *h*, *p*.

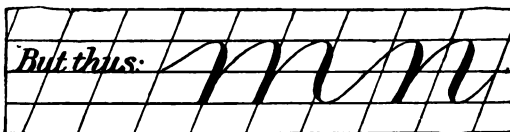
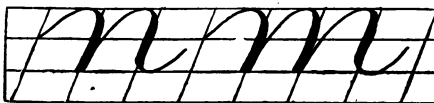


3 spaces = the width of *n*.

4 spaces = " " *m*.

4 lines = $1\frac{1}{2}$ heights.

5 lines = 2 "



But when *n* and *m* come together, they will be found to occupy not 7, 6 spaces. That is, there is a difficulty *when a hook follows a li*. The two occupy a space and a half—not two spaces, as might



supposed. Similarly, a half space is lost when *c* or *e* is followed by a hook.

2. Instruction and Practice.

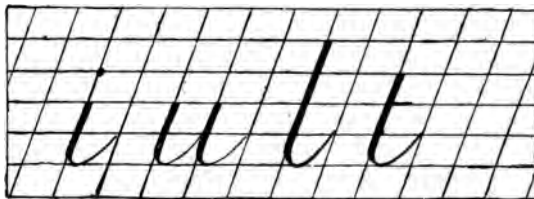
(a) The teacher writes on the B.B. and names each element.

(b) The teacher then writes letters and words on the B.B., the elements of which are dictated by the children.

(c) Then the children write elements and letters from the teacher's dictation.

3. Classification.—Thoroughness was insisted on. No child was allowed to leave anything until it had mastered it. The course consisted in giving elements, then letters, then words.

(a) **Right Line Link Class.**—The first lessons should be confined to this class, which includes the elements of the letters *i*, *u*, *l*, *t*.



(b) **Hook Class.**—The elements involved now are right line + link + hook. This will embrace the letters *n*, *m*, *h*, *p*.



(c) **The Curve Class.***—The *curve* is next introduced, and the elements involved are right line + link + hook + curve. Any letters containing these elements only can now be introduced.

(d) **The Loop Class.**—The *loop* is the next element. The elements now involved are the right line + link + hook + curve + loop. This admits the letters *j*, *g*, and *y*. In each case the heights and spacings of the letters should be noticed.

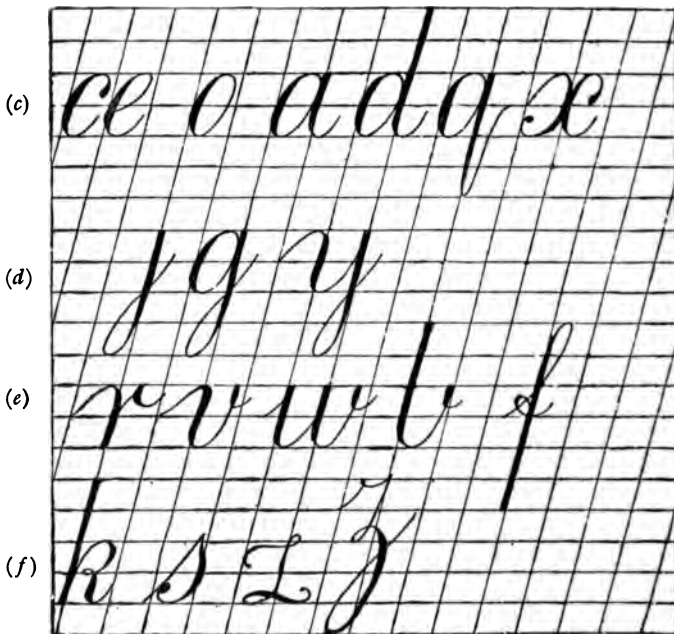
(e) **The Crotchet Class.**—The *crotchet* is next introduced. The elements now are right line + link + hook + curve + loop + crotchet. The letters *b*, *f*, *r*, *v*, *w* can now be introduced.

(f) **The Complex Class.**—The letters of this class do not fall readily into any of the preceding classes, and they have little in common. Each should be practised until its shape is quite familiar. This class includes the letters *k*, *s*, and *z*.

4. Criticism.—The method is well graded, commencing with the simplest elements and progressing to the most difficult letters. The rhomboids are a great aid for parallelism of slope, and they offer some assistance in spacing, as well as securing uniformity and proportion. But if a too free use of the rhomboids be made they become a hindrance. They are always more or less confusing, and often discouraging. The method is uninteresting in its earlier

* The following classes are illustrated on the next page.

stages, just when interest requires to be strong. The child is kept making strokes and pot hooks till it wearies of the whole thing. The variation of rules for the spacing of different combinations of letters is very perplexing to young pupils, and the whole method generally is too technical for speedy progress. Nevertheless, the system has stood the test of experience, and proved itself a good one, and up to the present no better system, on the whole, has yet arisen to take its place. The Education Department show their appreciation of it by frequently setting questions upon it in their examinations, and the young student is advised to study it thoroughly from some such book as Cowham's *Mulhauser's Manual of Writing*.



Questions on Mulhauser's System.

1. Arrange the following words in order according to the difficulty of writing they present to beginners, and give your reasons: man, mat, mamma, mask, mast, men, meat, mend, mane, most, mind (1877).

Now, to answer a question like this turn to Mulhauser's classes. Analyse the words here given into their elements, noting which class they fall into. Arrange them in their classes on this basis, and that will be the arrangement required. Your reasons will be the reasons for Mulhauser's classes; e.g. :—

man ;	elements involved are	right line, link, hook, double curve.	Classes 1, 2, and 3.
mat ;	„ „	right line, link, bar, double curve.	Classes 1 and 3.
mamma ;	„ „	right line, link, hook, double curve.	Classes 1, 2, and 3.
mask ;	„ „	right line, link, and two complex letters.	Classes 1, 3, and 6.
men ;	„ „	loop, curve, link, hook, right line.	Classes 1, 2, 3, and 4.
meat ;	„ „	loop, curve, link, double curve, right line, bar.	Classes 1, 2, 3, and 4.
mend ;	„ „	loop, curve, link, hook, right line, double curve.	Classes 1, 2, 3, and 4.
mane ;	„ „	double curve, right line, link, hook, loop, curve.	Classes 1, 2, 3, and 4.
most ;	„ „	double curve, $\frac{1}{2}$ crotchet, complex, right line, link, bar.	Classes 1, 3, 5, and 6.
mind ;	„ „	right line, link, hook, double curve.	Classes 1, 2, and 3.

The letter *m*, *i.e.*, the initial *m*, has not been considered in these analyses, as it figures in every word, and therefore cannot influence the difficulty of one against the other. Where the elements are the same the length of the word becomes a factor, and the combinations; *e.g.*, the elements of *mind* and *mamma* are the same, but *mind* is considered easier than *mamma* because it is shorter. Tested in this way, the words present themselves in the following order of difficulty: **mat, man, mind, mamma, men, meat, mend, mane, most, mask.**

2. *Show clearly the elementary component parts of the written letters, a, h, g, m, d* (1876).

Turn to Mulhauser's classes, and analyse the letters into their elements, thus:—

a = double curve, right line, link (*O* / *J*).
h = right line, two heights (*I*), hook (*γ*), right line (*I*), link (*J*).
g = double curve (*O*), right line, two heights down (*I*), loop (*J*), $\frac{1}{2}$ link (*I*).
m = $\left\{ \begin{array}{ll} \text{hook } (\gamma), & \text{right line } (I). \\ \text{do.,} & \text{do.} \\ \text{do.,} & \text{do., link } (J). \end{array} \right.$
d = double curve (*O*), right line, two heights (*I*), link (*J*).

Heights of Letters.—The *heights* of the letters should be committed to memory. The pupil should also practise himself in *spacing* the letters in different combinations, *e.g.*, *cru, mn*.

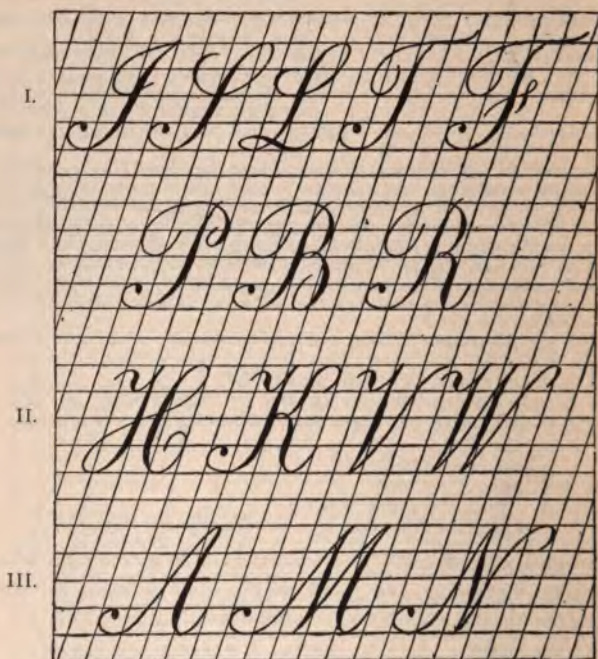
One height	= a, c, e, i, m, n, o, r, s, u, v, w, x.
One height and a half	= t.
Two heights	= b, d, h, k, l, q.
Two heights and a half	= g, j, p, y, z.
Three heights	= f.

CLASSIFICATION OF CAPITAL LETTERS.

Capital letters should be classified according to their similarity of form, and should be taught for writing in the groups thus formed. Any system of ruling by which the forms and proportions of letters are duly shown, and which produces a bold and legible

style, may be accounted a good one. But whatever system of ruling is adopted, generally speaking, each capital letter should be twice the height of a small letter, and this is true of all letters except J, Y, G and Z; these are $\frac{1}{2}$ higher. Mulhauser's system does not deal with capitals.

Group I. *The common element is the down stroke of the I.* The base of the letters should not be made too small, as they then look top heavy and inartistic. A common fault is to make the left-hand portions of the P, B, and R too small.



The right-hand loop of the P is often too large, whilst the up curve of the I is often written as a down curve. The T is the easiest letter, and should be taught first. The others should follow in this order: F, I, S, L, P, B, R.

Group II. The common element is *the down stroke with the hook head*. These letters are difficult, and require plenty of practice.

Group III. The common element here is *the upward curve*, which forms the first part of each letter. In the M and the N the teacher must see that the up curves are parallel. The neglect of this rule causes the production of some very distorted looking letters.

Group IV. The curve is the common element of this class. The letter will require plenty of practice to give that free sweep of the pen which is so requisite for the proper production of letters containing curves such as these.

Group V. The curve again is the common element, but it is the *reverse curve*. In this group the curve falls to the right; in Group IV. it goes to the left. It is a down curve in each letter except *D*, where it is an up curve. *D* is a difficult letter, and will require plenty of practice.

If the capitals are to be practised with rhomboids then copy books suitably ruled (B.B. also) must be supplied.



A SCHEME OF WRITING FOR INFANT SCHOOLS.

Writing can commence in the earliest classes of an infant school, for it makes little or no demand on the brain. It is an art which recognises the child's love of activity by encouraging its imitative faculty. Locke, in his system of writing, recommends that writing should begin when the child can read; but there is no necessity to wait so long. Instruction in the two subjects may go on together; and if any preference in time is to be given to either, then it must be to writing, as being the easier and more pleasing exercise.

I Preparation.—There are certain preliminaries requiring the teacher's attention for the successful working of any scheme. With young children like these, the holding of the pencil, the

position of the body, the length and pointing of the pencil, the slates, and B.B. will all need attention. The *pencils* should be pointed, and of reasonable length. Short pencils should be forbidden, as they lead to a cramped style. The *slates* should be ruled on one side in rhomboids, and the *B.B.* should be ruled to match the slates.

With young children like these, the formation of *good habits* is equally important with the formation of a good style of writing. For this reason there should be some *preliminary drill* leading up to the writing lesson. The slates and pencils should be orderly passed, the holding of the pencil should be shown and imitated, and the healthy position of the children should be insisted on.

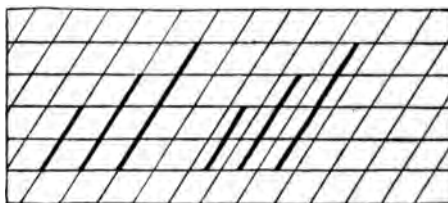
II. Plan of a Lesson.

1. **Copy setting.** The teacher writes on the B.B. the element or letter which the children have to imitate, the children watching carefully.
2. **Imitation.** The children then imitate on their slates.
3. **Position.** Meantime the teacher is noting the position of each child, and the way it is holding its pencil.
4. **Examination.** Every step must be seen by the teacher. The individual efforts of the children invariably call for fresh explanation and further demonstration on the B.B.
5. **Repetition.** The teacher goes through the same process with the next portion of the lesson, and so on until the lesson is complete.
6. **Revision.** The whole lesson should be revised.

III. Order of Lessons.

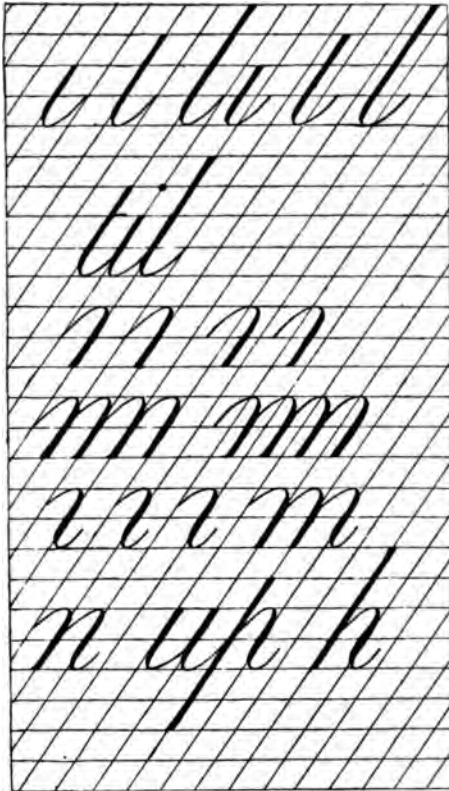
1. **Early Lessons.**—These should be confined—

(a) To the simplest elements of the letters. The first lessons should be devoted to the **right line**, and this should be practised at various heights.



The B.B. and one side of the slates should be ruled with rhomboids, and the earliest efforts should be limited to 1 height. Then $1\frac{1}{2}$ heights, and finally 2 heights. A right line of 2 heights requires more muscular control than at 1 height, hence a beginning should be made with 1 height. These lessons will simply form another example of their earliest drawing efforts, which will be limited to straight lines drawn with similar aids. When a fair degree of proficiency is attained on the lines, the class should receive lessons and practice in writing the same element *between* the lines.

- (b) **The Link** should be taken next, as it is the simplest extension of the right line for the purposes of writing. Here, again, the same order should be pursued, both as to heights and lines and spaces. The teacher might then combine these elements into a word—*til*—thus giving the first lesson in **joins**, and bringing more interest to bear on the work. The addition of the **bar** in the letter *t* will present no difficulty.
- (c) **The Hook**.—This is another simple combination with the right line. The same steps should be followed as in the previous cases. The element



should be practised separately, first on *lines*, then in *spaces*, and then with the *joins*. The letters *u*, *n*, and *m* could then be introduced, and combinations made of these three elements into words such as *in*, *tin*, *nit*, *til*, *mil*, etc. The letters *p* and *h* can now be introduced, the number of words thus being again increased. These lessons ought to be sufficient for the baby room and for the class above, but the division of a scheme must of necessity depend upon the number of classes in the

school. But if the school be small or the staff weak, too little should be attempted at the bottom, rather than too much at the top. Assuming there are six classes in the school, and a baby room, the next lesson should commence with Class V.

2. Class V.—The remaining elements should now be introduced, *viz.*, the **curve**, single (l) and double (O), the **loop**, both up and down and the **crotchet** (Λ). They should be introduced in the order named, and each element should pass through the same stages of treatment as in the previous cases. Combinations should be introduced as each element is mastered, so that interest may not flag. Later on the **complex** letters **s**, **x**, **z**, **k** should be given one at the time, and finally the class should be writing small words. The writing should be $\frac{1}{2}$ of an inch.



3. Class IV.—The work of this class should be a simple expansion of the work in Class V. Longer words should be introduced, and more difficult combinations. The writing should still be $\frac{1}{2}$ of an inch in height. If the rhomboids are retained, the height of the rhomboids must determine the size of the writing; but, if possible, the rhomboids should be ruled $\frac{1}{2}$ of an inch in height.



4. Class III.—The capital letters should now be introduced in the order previously laid down for their classification. Their height should be $\frac{3}{4}$ of an inch, or twice the size of the other letters. For capitals the rhomboids are perplexing at first, but patience will overcome this difficulty. Slates should still be used, but if paper is adopted then the children should have the assistance of **tracing**, which could be done by the teacher with black lead, and should be apportioned to the individual wants of each child. Copies should be set on the B.B., and the construction, height, and proportion of each letter, as well as the joins, should be repeatedly demonstrated. The formation of a good style at this plastic age is very important. Heights should not yet be looped.

5. Class II.—The work should now be on paper, although there is a division of opinion on the subject. The work will consist of a recapitulation of the steps already taken on slates. The climax will be to produce the same degree of work and excellence on paper that is produced in Class III. on slates. *Tracing* will still be used with the same restrictions as in the previous Standard, and the teacher is recommended to *pattern-write*, whenever opportunity presents itself, in the books or on the paper of each child. Nothing stimulates effort and tends to produce a good style and a uniform "hand" like this. If the work is still confined to slates, a greater degree of excellence should be expected, and double heights (except *d*, of course) should be looped.

6. Class I.—The same standard of writing should be reached here as is expected in Standard I.

THE SIZE OF WRITING.

I. Small Hand.—The introduction of small hand should not be deferred too long. Writing, in school life, obtains much of its value as an aid to other departments of instruction, and it is not well to let such a force lie idle longer than necessary, despite its difficulties.

1. Difficulties.—The chief difficulties are mechanical. A finer command of the *muscles* of the hand and arm is required; the *judgment* requires more development, for neither proportions nor space are so obvious as in large or text hand. As a result it makes more demand on the *eye*, hence more cultivation is needed for the proper appreciation of the forms and proportions of the letters, and greater care and exactness are required for regularity and uniformity.

2. How learned.—Small hand may be learned best by a careful gradation of the size of the writing. When children leave an infant school their writing is generally large or half text. In the upper departments a First Standard should write half text, *i.e.*, the writing should be about $\frac{3}{4}$ of an inch in size. A large small hand might be adopted for Standard II., and a legitimate small hand might reasonably be expected in Standard III.

The copy books and exercise books should be double ruled up to the Third Standard. This mechanical aid, supplemented by ordinary care and teaching, with *pattern-writing* now and then in the books of the pupils, and with demonstrations of the most apparent errors on the B.B., ought to secure good small hand.

II. Large Hand.—There is a good deal of vagueness as to what is meant by large hand. It is synonymous with text and half text, and practically means that the small letters are to be $\frac{3}{4}$ of an inch in height. The object to be kept in view is command of the pen and freedom of hand. It increases and develops the power gained over the hand, and should therefore be practised sometimes in the higher classes. Apart from this it has a good business value, and therefore should be maintained. Its advantages are the antithesis of the difficulties of small hand. It also provides a desirable change from the small hand, appeals more to the artistic sense, and helps to maintain a good style.

Copies.—There are three methods in use.

I. Set Copies.—Blank books are used by many teachers who set their own copies; and where this system is possible, it is considered by many to be the best, for the following reasons:—

1. The pupil is encouraged to do what he knows his teacher *has* done. The value of the copy is increased if the child can *see* the teacher set the copy under similar conditions to those under which he has to write it afterwards.
2. Writing is an *imitative* process, and the imitative faculty is more encouraged than by any other process.
3. Set copies are an *aid to discipline*. Children appreciate good writing more rapidly than excellence in any other subject. The teacher who writes fine copy-heads wins the admiration of the class.
4. They can be *readily varied* to suit the varying progress of the different scholars.

Objections.—There are certain objections urged against this system by the advocates of the next, whether the copy-heads are written in the books or the copy is set from the B.B. In most schools with their large classes the B.B. copies must of necessity be the form the set copies take, as there would not be time for individual copy setting. As a matter of fact, the objections are practically levelled against the B.B. copies, because few teachers have the time to practise the other method. Mr. Jackson makes the following objections :—

1. *B.B. copies are inferior and defective*, and inferior copies produce defective writing. The teacher requires to write a good hand to teach properly from B.B. copies ; but many teachers cannot write well, and therefore for many teachers the system is not an efficient one.
2. *B.B. copies are irregular and varying*. Change of class or Standard, or change of teacher, will change not only the style of writing but the mode or method of instruction also.
3. *B.B. copies are often ungraded or badly graded*. This weakness is likely to be found in rural and very large schools. It is asserted that it is not possible to obtain properly graded copies from haphazard sentences extemporised for the occasion. The teacher's labours will thus be heavily handicapped and the progress proportionately retarded.
4. *B.B. copies are so transient*. Efficient correction is simply an impossibility, more particularly in large classes. After the writing lesson of the day, correction by comparison is out of the question.
5. *The promiscuous character of these copies* seriously militates against their adoption. The copies are neither consecutive, well arranged, nor educative very often.
6. *Individual grading is impossible with B.B. copies*, and this is one of the most serious flaws of the system ; 40 to 60 boys, however classified, must require distinct and separate treatment, and they cannot get it from B.B. copies.
7. *B.B. copies waste time*—the time the teacher takes in setting the copy, the time the quick, the gifted, and the facile lose in going the same pace as the slowest members of the class.
8. *B.B. copies are more difficult*. It is much easier to *fac-simile* the same size, than to *reduce* and *fac-simile*. It is easier to imitate a copy on paper than a copy on a B.B. often many feet distant from the paper.
9. *B.B. copies make no provision for short-sighted children*, and this may prove another serious objection.
10. *They make no provision for absentees*. This becomes a particular case of the sixth objection. If a child has been absent for some time, it has to do the same work as those whose instruction and practice have never stopped.
11. *Generally*, the use of blank books is an attempt to elevate an art by the removal of its highest and most perfect models, and by the substitution of inferior standards.

II. Engraved Headlines.—This is the copy-book system, with its printed or engraved copies. It is the system generally in use, and the large classes of our town modern schools make it almost a necessity. It is an easy plan, and saves the teacher's time, but it is not considered a good plan by some until the child has mastered the ordinary difficulties of writing ; and an abuse of the system has been responsible for a good deal of bad writing. These headlines are one of the results of the pupil teacher system, and an able and conscientious pupil teacher could give good writing lessons with their aid.

The engraved headlines can be placed two or three on a page, and they are, as a rule, well graduated and often educative. Mechanical aids, where necessary, are given, and to the extent thought desirable. If each page contains several copies, there is some guarantee that the pupils will imitate their copies. But unless the books are inspected every two or three lines, or unless the teacher is passing continuously from boy to boy during the writing lesson, the copies will often be unnoticed by the pupils, and bad habits and bad writing are very often the result. A study of the objections to B.B. copies would suggest the advantages alleged by some teachers to be possessed by engraved headlines.

III. Copy Slips.—Undoubtedly this is the worst method, and fortunately it is rapidly disappearing. The following are the objections usually put forward against them :—

1. Pupils write first line from imitation, and then very often take no further notice of their copy slip. Close supervision is the only way to check this.
2. The copy slips soon become dirty and ragged, and their moral influence is then bad for the school.
3. However expeditiously they may be distributed, there must always be an unnecessary expenditure of time over the process. The little thought required to fix and select a properly graded copy may become a serious item in the total, especially if the class is a large one.
4. But used by a skilful and careful teacher, in conjunction with the B.B., they may be of some use. The system allows good gradation, and the copy slips may be moved down the book so as to have the copy always immediately above the pupil's writing.

TRACING.

I. Advantages.—Tracing in writing is some aid to a beginner. The muscles are trained, the style of writing is more or less fixed, the proportions of letters are given, the spacing is regulated, the joins and uniformity of thickness are taught, the eye and the judgment are simultaneously cultivated with the muscles, and the class all acquire the same "hand".

II. Teaching.—The chief thing for the teacher to decide is how much tracing can be allowed with the greatest profit. Writing is an imitative art, and is commenced when the imitative faculty is strong in children, and the muscles are plastic. But it is doubtful whether it teaches much in the way of imitation. It is good hand training; it is not so certain that it is good eye training. The children often trace or mark over the letters mechanically, with little or no thought of form.

All new elements should be traced as they are introduced; and they should be introduced as laid down in the "System of Writing for Infant Schools". The amount of tracing requisite really depends upon the individual capacity of each child; but as the teacher will be compelled to adopt a series of copy books, as a rule, he should seek a series which grades the tracing best. Some such graduation as follows should be expected:—

1. The *element* is introduced, and there will be a *copy or two of tracing*.
2. Then follow copies in which the *tracing is intermitted with independent effort*, the intervals for the latter gradually becoming less.
3. Then will follow a copy or two of *independent effort*.
4. The *next element* should then be introduced, and the same order should be observed.
5. *Combination exercises* should then be given.
6. This order will be continued until a letter or letters can be made. The tracing should still be graded, but the *quantity* should be reduced.
7. Tracing will not be needed beyond the "letter" stage. When a pupil can make "letters" he should be thrown on his own resources, so far as tracing is concerned.

III. Disadvantages.

1. Unless carefully watched and regulated, tracing may make the children dependent, careless, and lazy.
2. If the teacher uses blank books, or gives tracing assistance in any books, he must be a good writer, or the class will repeat his deficiencies.
3. The printed copies for tracing, with their copperplate perfection, often discourage the scholar, who thinks such excellence unattainable. Hence the teacher must often supply the trace in black lead.
4. It allows the pupils, unless closely watched, to begin their letters anywhere, and so to generate bad habits in writing.

HOW TO TEST WRITING.

1. The down strokes of right lines must be of uniform thickness.
2. The strokes must not be rough.
3. The letters must be well proportioned.
4. The links and hooks must be neither too thick nor too fine.
5. The curves must be properly formed.
6. The letters must be properly joined.
7. The letters must preserve their parallelism.
8. The form of the letters must be accurate.
9. The letters must be carefully spaced.
10. The composition, transcription, and dictation exercise should bear out the style and character of the copy setting.

GOOD WRITING.

I. Its Characteristics.—These are legibility, grace or symmetry, ease and rapidity.

II. How Secured.

1. **Legibility.**—Legibility in writing ought to be as important as distinctness in articulation. This is the first and most essential attribute of writing, and if

necessary everything else should give way to it. If the writing is to be legible the letters must be simple, for flourishes spoil legibility. The letters should be round or oval, according to the style used, but never pointed, as in the angular Italian "ladies" hand. Good writing is always legible, and the upright hand is probably more legible than the sloping. The heights and thickness of the letters must be attended to, for uniformity aids legibility. The letters and words should also be correctly spaced, and the joins carefully made.

2. Grace.—By grace or symmetry of style we mean that the forms of the letters should be pleasing to the eye. Many of the elements of legibility are also elements of beauty, especially parallelism, finish, and uniformity.

3. Ease and Rapidity.—These are the result mainly of a good style and plenty of practice. The position of the body, the manner of holding the pen, the style of writing adopted, the kind of training the pupil has received in this subject, the absence of flourishes, and personal endowment are all factors requiring attention. The pupil should not be allowed to take the pen off the paper, as a rule, whilst writing a word, or the writing may be neither free nor flowing. Under no circumstances must legibility be sacrificed to pace.

Points to be Noticed in Writing Lessons. (Fearon.)

1. The difference between examination and teaching. Is every child taught to write, or is the teacher merely satisfied with examining *how* he writes?
2. Let the child begin to handle the pen as soon as possible; *i.e.*, as soon as he has progressed far enough in the use of the pencil.
3. Is the work of the classes *systematically* corrected, so as to regulate pace as well as to test the results?
4. Can the teacher write well on the B.B.?
5. Can he give collective instruction in writing?

With respect to number 4 the Department has expressed an opinion on this subject. It says: "The capacity to teach handwriting is an essential qualification of any teacher; but a teacher who is himself a bad writer can never, by the most skilful teaching, entirely destroy the bad effect of his own example".

CHIEF ERRORS IN WRITING.—The Education Department itself has laid down the most noticeable errors in writing. According to its own memorandum issued on the subject, these are:—

1. "Want of uniformity in the thickness of the straight lines.
2. Roughness of stroke.
3. Letters too tall or too short.
4. Links and hooks too thick or too fine.
5. Curves wrongly formed.
6. Letters not properly formed;" and to these might be added:—
7. Unsuitable slope. It is sometimes too great, sometimes not parallel, sometimes too acute, sometimes too obtuse. From 90° to 60° is the best angle.
8. "Writing as taught in schools is apt to be too small and indistinct. Pupils should be taught to write a firm, round, legible hand."

How to Deal with Them.

1. There should be demonstration on the B.B., and explanation of style, rules, etc., followed by pattern writing in the books of the chief offenders against uniformity of thickness.

2. Pattern writing is the best remedy for this.
3. The sizes of the letters should be given, and their relative sizes demonstrated on the B.B., which should be ruled to match the style of ruling on the slates. The errors should be placed side by side on the B.B. with the corrected copy.
4. These elements should be analysed on the B.B., and the correction should then proceed as in number 3. Analysis, comparison, and pattern writing should follow each other.
5. Correct the position of the body, and see that the pen is held properly. The curves are often badly made through physical faults. They are often wrongly formed through bad teaching, no teaching, bad supervision, and an abuse of rhomboids.
6. The same remarks are equally true here. Both faults have the same origin, and require the same treatment. The incorrect and the correct should be pointed out on the B.B. side by side; the letters should be analysed, and slowly formed in the presence of the class. Plenty of practice should then be given, supported by close supervision.
7. Use rhomboids, and give plenty of practice.
8. The remedy is obvious.

Vertical Writing.—The advocates of this system offer the following arguments in support of it:—

1. It is the most scientific, hygienic, consistent, and comprehensive. Three of these claims are debatable, but there is no doubt about the other. This system is undoubtedly more healthy than the sloping style. The body is straight and the shoulders are level. The two arms are placed equally, and the result is no twisting of the back, and no risk of curvature of the spine. Obliquity of vision is also guarded against, for the eyes are at equal distances from the writing. The writing, being upright, makes less strain on the eyes, for they are accustomed to the upright style in printing. It is also claimed for it that it prevents writers' cramp, and adapts itself equally to both hands.
2. It is the most simple and natural.
3. It is the easiest to teach, learn, and write.
4. It is the most rapid, legible, fluent, and elegant.
It is undoubtedly the most rapid, for the strokes being shorter must take less time in making. Its approximation to printing, so far as direction is concerned, and its rounder base make it the most legible.
5. It is the most educative and the most carefully graded.
6. It is free from all empirical disfigurements, for it has simple capitals and short loops.
7. It secures the greatest freedom in junction.
8. It presents a minimum of shading in the down strokes.

Slates or Paper?

Should young children begin to write on slates or on paper? There is some diversity of opinion, but there is not much diversity in practice on the subject. The following arguments are used:—

Slates.	Paper.
<p>1. Slates are more economical. It is almost too expensive to furnish every child continuously with paper in every school, and paper writing requires more teaching and more supervision.</p> <p>2. Slates are more conducive to order than paper, unless the school is remarkably well staffed. They are sooner given out, and more easily managed.</p> <p>3. Progress is more rapid with slates than with paper—at first; and, as writing helps spelling, composition, transcription, and dictation, there is better progress made in these subjects. Again, the pencil is easier to manipulate than the pen, and this brings slate writing under the general principle that difficulties should be approached one at a time.</p> <p>4. The Code begins with slates.</p> <p>5. Slates often involve the use of stumps of pencil, and they are therefore risky training.</p> <p>6. The ease with which errors can be corrected makes children careless.</p> <p>7. The <i>cleaning of slates</i> is generally filthy and dangerous.</p>	<p>1. Paper is more instructive. Experience shows that the ability to write well on slates does not necessarily mean ability to write well on paper; whereas, generally, the children who can write well on paper can write well on slates.</p> <p>2. Paper is best for discipline. Habits of care, accuracy, neatness, and beauty are more likely to be engendered by paper.</p> <p>3. Some, however, dispute this. They maintain that to begin on paper is the <i>quickest and most profitable way</i>, and that <i>slate writing is often a hindrance</i> to writing well on paper, from the formation of bad habits. Children can begin on paper with black lead pencils. This is a compromise between paper and slates; but with young children the breaking of the pencil points is a serious consideration.</p> <p>Judgment. A weighing of this evidence shows that— <i>Theoretically</i> it is best to begin on paper, for children gain greater ability, are better trained morally, and avoid hindrances. <i>Practically.</i> Experience shows that it is best to begin on slates. It is more economical, more orderly, and more profitable for a time.</p>

Manual Employments and Writing.

The connection between these two things is educationally very important; for as writing is essentially a matter for both hand and eye, and as the one great object of all manual employments is to train both hand and eye, the connection stands revealed at once. This truth is obvious from an examination of the qualities required for writing. The eye has to learn to distinguish the shades of outline, heights, and distances, which vary absolutely and relatively, and to appreciate the different grades of beauty in the various forms of curve employed. The child must learn to perceive a shape before he can imitate it. Then comes manual training. The discipline of the muscles, regulated by the judgment of the eye, and both demanding much practice, shows writing to be essentially a matter of hand and eye training.

Now, the problem is, which of the many exercises embraced under the terms Kindergarten or Manual Training give this required training in the sense demanded by writing, remembering that the problem applies to Infant School children?

The Kindergarten method of learning to write shows that

several "occupations" contribute to this training, for this method consists of four steps, each of which is a means for manual training.

1. **Clay Modelling.**—The hand is first trained upon moulding objects in clay.
2. **Paper Cutting.**—The cutting out of paper figures follows.
3. **Drawing.**—These exercises gradually lead up to elementary drawing.
4. **Writing.**—The children then commence writing lessons.

It will be noticed that *drawing* is the final step preparatory to writing itself; and if drawing be reckoned among such employments, it undoubtedly assists more than anything, for writing is but another form of drawing. This is obvious from a comparison of the elements involved.

	Writing.		Drawing.
/	The right line.		Perpendicular line.
l	The link.	—	Horizontal line.
hook	The hook.	∨	Oblique lines.
hook	The crotchet.		Various forms of the curve, including the O (circle).
hook	The curve.		Drawing is a combination of these.
hook	The bar.		
hook	Writing is a combination of these.		

Ruling of Slates.

Slates may be ruled in several different ways, all of which have something to be said in their favour. One important method, the *rhomboidal*, has already been pointed out and illustrated, but other methods are now more frequently used. To say nothing of the trouble or expense of ruling, just where the rhomboids are most useful, there they are most confusing. Young children get muddled and discouraged with the many lines of this method and its many technicalities.

Generally, the style of ruling adopted will depend upon the class. The younger the class, up to a certain limit, the more help they want.

For Infants.—As a rule four lines are used in ruling the slates, but five are an improvement. When four only are used no line is given for joins, and children require as much help there as anywhere. The object is to avoid confusing the children whilst helping them, and this is easily done by a judicious mixture of faint and thick lines. A specimen of the proposed ruling follows. Between each complete set of lines as here shown a space of $\frac{3}{8}$ of an inch should be left,

$\frac{3}{8}$ of an inch space.

$\frac{1}{8}$ " "

$\frac{1}{8}$ " "

$\frac{3}{8}$ " "

$\frac{3}{8}$ " "

$\frac{3}{8}$ " "

$\frac{3}{8}$ " "

$\frac{3}{8}$ " "

$\frac{3}{8}$ " "

lumps

lightly

For Standard I.—Less help should now be given, and only sets of three lines should be used, one for heights and one for the ordinary letters. The size of the writing should be reduced, and the spacings between sets of lines should be less. This ruling will suit Standard I. also in an Infant School, or any class approximating to the work of Standard I. The line for the joins may or may not be retained, but where possible it ought to be omitted. If retained this gives two alternative forms for threefold ruling; one as in the specimen given below, and the other consisting of the two thick lines, with a centre faint one for the joins. The one system fixes the heights and depths of long letters, the other the joins: and as there are many more joins than heights the method of joins is probably the better.

$\frac{1}{4}$ of an inch.

$\frac{1}{4}$ " "

$\frac{1}{4}$ " "

$\frac{1}{4}$ " "

$\frac{1}{4}$ " "

$\frac{1}{4}$ " "

Building

Lovely

For Standard II.—The ruling should now simply be two lines, at such a distance as gives what is called a large small hand. Such ruling is found in some of the blank copy books, and is generally spoken of as double lines. A specimen follows:—

Normandy is hilly.

Other Standards.—These should be left to the ordinary one-line ruling, as seen in copy books and exercise books. If any assistance is required in correcting faults and giving practice to prevent their recurrence, Mulhauser's rhomboids might be used. But they should be dropped as soon as the correction is fixed.

EXAMINATION QUESTIONS.

- 1.—Write as a large hand copy the words "*Geometrical Drawing*," and point out which of the letters are likely to present special difficulties to a young scholar, and what rules should be observed in forming such letters.
- 2.—Arrange the letters of the alphabet in the order of their difficulty for the teaching of writing; and show how you would group together the easiest of them, for lessons to young beginners.
- 3.—Show how you would group the capital letters in the English alphabet for teaching.
- 4.—Show what kind of ruling on the slates and copy books of the younger children is best suited to teach the proper forms and proportions of letters. Give illustrations.
- 5.—Write six capital letters in such a way as to show the proper forms and proportions of their parts, and say how you would give a lesson on them.
- 6.—Write the words "*Geographical Analysis*" in text hand, and give rules for the length of the letters *p*, *h*, *l*, and *y*.
- 7.—Explain fully the principles of Mulhauser's method of teaching writing; and write the word "trustfulness" according to that method.
- 8.—Describe the proper position of the body for writing, the right way of holding the pen, and the best way of setting copies for advanced classes.
- 9.—What elements are common to the written letters *p*, *q*, *h*, *g*, *d*, *y*? In what order, and in what combinations, would you teach these elements to infants?
- 10.—What are the chief difficulties to be encountered by a child beginning small hand copies? How would you deal with them?
- 11.—Arrange the following words in order according to the difficulty of writing they present to beginners, and give your reasons: *man*, *mat*, *mamma*, *mask*, *mast*, *men*, *meal*, *mend*, *mane*, *most*, *mind*.
- 12.—Show clearly the elementary component parts of the written letters *a*, *h*, *g*, *m*, *d*.
- 13.—How would you teach children to write (*a*) on slates, or (*b*) on paper? What are the important points to be attended to in teaching children to write?
- 14.—Show how you would group or classify the letters of the alphabet for teaching the elements of writing to very young children. Explain by an illustration what use can be made of the system of threefold ruling on slate or copy book.
- 15.—Say what use you think it right to make of "tracing" in teaching writing. Write in large hand the five capital letters *B*, *K*, *Q*, *M*, *W*, and point out the commoner faults made by learners in forming them.
- 16.—Draw up a course to be followed in the teaching of handwriting to each of the classes of an infant school, giving examples of the size and style of the letters you would adopt.
- 17.—Which do you prefer in teaching writing—engraved copies, or copies set by the teacher on the B.B.? Give reasons for your preference, and write, as illustrations of the true forms and proportions of letters, four capital letters and four small letters such as should be grouped together for the purpose of teaching.
- 18.—Classify the capital letters according to the similarity of their forms, and the order in which you would teach them. Give specimens of any six capital letters, carefully written, so as to illustrate their proportions and the rules for their formation.
- 19.—What are the advantages of teaching large hand before small or running hand, and how far is it desirable to continue large hand practice in the upper classes? Give a model copy in each hand.
- 20.—Give some simple rules showing the best way of conducting a class lesson in writing.
- 21.—Describe the best way of ruling slates so as to help young scholars to understand the forms and proportions of letters. Give an example.
- 22.—Describe the way of teaching the children to hold their pencils properly. What are the common mistakes to be guarded against?
- 23.—In writing in copy books there is a great tendency to repeat the same mistakes down a whole page. What is the best method of correcting this?
- 24.—What is the use of tracing in the earlier copy book exercises, and what are the objections, if any, to the practice?
- 25.—Write the word "*striding*" in small letters, and point out the mistakes in it which you would watch for.
- 26.—What use could you make of a threefold ruling of the lines on a child's slate and on the teacher's B.B., in order to show more clearly the forms and proportions of letters and the mode of joining them?
- 27.—Which of the manual employments of an infant school is most useful as a help in the teaching of writing? Explain and illustrate your answer.

CHAPTER XII.

GEOGRAPHY.

OBJECTS OF TEACHING GEOGRAPHY.

I. Primary.—The practical value attached to a knowledge of the subject must always be considered its primary object, and the chief practical objects are as follow :—

1. Maps and Plans.—The pupil is taught to grasp the meaning and use of these, and as they figure appreciably in the everyday life of the people, a right understanding of them is important.

2. Trade and Commerce.—England is the greatest manufacturing and commercial nation of the world. If this supremacy is to be maintained, the productive districts and the chief markets, actual and potential, should be known. The quickest, safest, and cheapest trade routes ; the national tastes and requirements of foreign customers ; the sources of our food supply, and many kindred questions also become of vital importance.

3. Literature.—Much of our literature, and especially newspapers, assumes a fair amount of geographical knowledge, hence this subject should be taught for the intelligent comprehension of modern literature.

4. Emigration.—England is said to be over-populated, and fields for emigration are essential to relieve the surplus population, and to carry out the advisable and beneficent planting of the earth by the English people.

5. Naval Power.—England is the greatest naval and maritime power in the world. From this point of view alone the necessity for geographical knowledge is obvious.

II. Secondary.—Rightly taught, the subject is interesting, instructive, pleasant, and intellectual. It affords excellent opportunities for intellectual training ; observation, imagination, memory, and reasoning all being cultivated by its teaching. These subjects are dealt with more fully under the next heading.

GENERAL PRINCIPLES.

If the subject is to be presented to the pupils in an interesting and scientific manner, if the interest is to be maintained, and if the dull and backward children are not to be left in the rear, then there are certain general principles which it will be necessary to observe in its teaching.

1. Illustration.—The subject must be profusely illustrated, for this arouses interest and gives life to the lesson. The *B.B.* should be freely used, and *sketches* in coloured chalks introduced where necessary. *Maps* and *diagrams* of all sorts, *apparatus* and *models*, are essential. *Objects of manufactures*, export and import, should be exhibited. Even *reading*, *poetry*, and *anecdotes* may be utilised for this purpose. Treatment of this sort will tend to destroy the still paramount idea among children, that geography is a dry subject.

2. Intelligence.—One of the great faults of modern geography lessons is the undue use of the memory involved. Memory will always be necessary, but the higher faculties of the mind should be called into play. The *reasoning* powers of the pupils should be taxed. *Observation* should be stimulated by careful attention to the local physical and political facts. So far as possible, the locality of the school should be made to furnish the illustrations, the instances, and sometimes even the lessons themselves. The pupils will then see things more fully, and with more interest. They will form the habit of noticing things in the best sense of the word. Then, in good lessons, there is plenty of scope for the proper development of the *imagination*, and for this purpose ideas rather than words must be given. Graphic description must be cultivated by the teacher, so that the mental image created by the child may approximate to the real thing described. The mental effort required to form a picture of an Indian forest, or a mine, is greatly aided by good verbal description, pictures, and sketches. There should also be *continuity* in the teaching. Isolated facts have little interest for children, so that each fact should be presented in relation to other facts.

3. Memory.—The abuse of geography chiefly rests here. The memory is often overworked, to the neglect of the other faculties involved. The object of the teacher is to get the biggest return for the smallest outlay of memory. Too often there is mere rote work, without any, or with but little intelligence, as in the learning

of strings of bays, capes, or counties. To avoid this we must arouse *interest* by *natural associations*. *Classifications* must be made on the basis of real resemblances. A free use of *comparison* and *contrast*, which present the positive and negative side of the comparative method, should be made, and the assistance of *drawing* and *pictures* should be enlisted; for drawing is a fine aid to the graphic memory, whilst pictures appeal to the pictorial memory, which is good in most children.

Instances of *natural association* would be the joining of certain bays with certain ports; coal fields with manufactures; productions with industries. The *etymology* of the names of places may be given in the higher classes, and some choice may be exercised in the presentation of facts. This choice of facts should be regulated by the following rules:—

- (a) All statistics should be given in comparison with some well-known standard; *e.g.*, all areas might be compared with that of England.
- (b) General statistics should be given in round numbers.
- (c) Special statistics in exact figures.

4. Reasoning.—Classifications, generalisations, and discoveries have to be made; cause and effect traced; and the general truths of the subject demonstrated and grasped.

5. Graduation.—The first lessons should be very simple, and there should be a careful graduation of subsequent lessons. Familiar terms should be used where possible, rather than technical ones, which could and should be introduced later; *e.g.*, “neck” for “isthmus,” “feeder” for “tributary,” etc. Then the lessons should be short, so that they may be thorough, and they should show a unity of plan. There is always a temptation to digress, and this should be resisted.

6. Realistic.—The teaching should be realistic. The children should be encouraged to observe local features, and to describe them orally to the teacher. The child's knowledge and experience should be used, for this knowledge will form the basis for efforts of constructive imagination when proceeding to the unknown. By the aid of models, toys, apparatus, and specimens, the *real* things, or substantial approximations to them, can be shown. Children can see in this way real miniature mountains, real rivers, real capes, etc.

FIRST LESSONS IN GEOGRAPHY.

The first lessons in geography should be given as a series of *object lessons* connected with familiar things, and freely illustrated by *pictures*. The children will then commence—as they should—

with the *concrete*, for the elementary notions that form the basis of all true geographical teaching must be gained through the senses, and the subsequent transition to the abstract will then be made with greater ease and success. The more simple objects should be taken first, such as earthenware, iron, wood, tin, coal and chalk. The children should not only see the articles but also handle them, and so all their ideas will thus be accurate and sound. Furthermore, let them name any of the *uses* of these objects, and this will show to them the reason why men take so much trouble to get them. Receive and utilise every answer that is in the least pertinent. The *places* from which they are obtained might be described with the aid of pictures, and the *distance* of each place could be given by estimating the time it would take a person to walk there. The manner of bringing them—train, road, river, or ship—could then be pointed out.

Such a course as this will necessarily involve lessons and explanations of the various geographical *definitions*, and these could be taught realistically.

The *productions* of our own land should next receive attention—animal, vegetable, and mineral. These could subsequently be compared with the *productions of other countries*, the better known being taken first. These lessons on other lands will require efforts of *imagination*, which will thus get material supplied for fresh constructive efforts.

Finally, the lessons might embrace the people, their trades and occupations, their customs, their food, clothing, habits, etc. ; and these again in their turn should be compared with those of other countries.

PLANS.

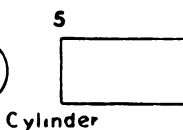
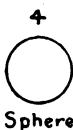
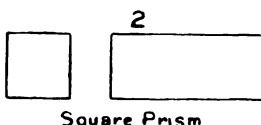
I. Simple Plans.—The teacher's first task is to give the children an accurate idea of what is meant by a plan. For this purpose a number of simple and suitable familiar objects should be used for demonstration. The lesson will require some such graduation as follows, commencing with the dot or point, and finishing with some simple geometric solid or common object. It is not advisable at this stage to bother about scale. It will be sufficient for the present to simply preserve a general proportion, the children aiding by suggesting as much as possible the drawing of the lines.

A plan is properly the representation of anything drawn on a

plane, and in a special sense it is the representation of a horizontal section of anything. The teacher's task is to convey this information in simple language and by suitable demonstration. On no account should such a definition be given to the class; but explanation and demonstration by the teacher should be followed by a simple description from the class. It is advised that an attempt be made to develop the idea by some such method as follows :—

1. First Ideas.

- (a) The children take their slates and pencils. Each one is instructed to make a *dot* on his slate, the teacher doing likewise. The teacher then brings his eye in a direct line over the dot on his slate, and invites the class to do likewise. They are then asked to describe what they see—a *dot*. That is called the *plan* of a dot.
- (b) The teacher next takes a *knitting needle* or something similar. It is held in a *horizontal position*, and is brought in a direct line beneath the eyes of several of the boys. They are again invited to describe what they see—a *straight line (B)*. That is called the *plan of the knitting needle*. The teacher draws the plan on the B.B., and directs the class to draw a similar plan on their slates. The needle is then held *vertically*, and the same process is followed. This time they see only a *point* or dot. That is the plan of the needle in a vertical position (A).
- (c) A *square* piece of paper or cardboard is next taken. The same method is adopted. The square is first held horizontally in a direct line beneath the eye; the class is invited to name what they see; the plan is then drawn on the B.B. by the teacher, and the class are instructed to draw the plan (A) on their slates. The figure (A) is called the *plan of the square*. The square is next held in a vertical position; the same steps are gone through, and the plan is recognised as the figure (B).
- (d) Other figures should be treated in a similar way, great care being taken to see that they are carefully graded, and that the one more or less naturally suggests or leads to the other. Where the figure has two views, or two simple plans, each should be dealt with. The order recommended is as follows :—

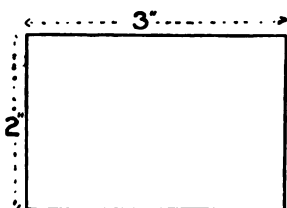


2. Transition Objects.

- (c) The class will now be ready to proceed to the *table* and the *floor*. Hitherto the objects have been smaller than the B.B. Now they are probably as large in one case, and certainly larger in the other. There has been no drawing to scale up to the present, only a rough proportion being observed. The table and the floor form an easy and suitable transition from smaller to larger plans; from simple to more complex objects; from scaleless drawings to drawings to scale.

II. Plans to Scale.

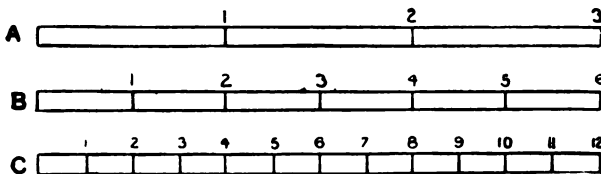
- (a) Draw a plan of the school *table*. To the children it is obviously too large to be drawn full size. It must be drawn smaller than its real size. Hence arises the necessity for *scale*. But the teacher is advised



to avoid the word at present. We can draw it half, or one-quarter, or one-twelfth its real size. Let a couple of boys come out and measure the table—one its length and the other its breadth. Supposing the dimensions to be 3 feet by 2 feet, and it is decided to draw it one-twelfth its real size; some members of the class will be able to tell you that there are twelve inches in a foot (if not, tell them), and that therefore every foot will be drawn in the plan as one inch. Hence the drawing

will be 3 inches by 2. Draw the plan on the B.B.; then serve out flat geometric rulers, and tell *each member of the class to draw the plan on his slate*. The teacher should then test the plans by sample and correct where necessary.

- (b) The class will now be ready for the word *scale*. Tell them that such a drawing is said to be made to scale, and that in this case the scale is said to be *one inch to the foot*. Now explain, demonstrate, question, and exercise the class until they can grasp such representations of scales as follow:—



Scales of Feet

Draw the scale A upon the B.B. Tell the class it represents three feet. Measure it—it is 3 inches. Then every inch represents 1 foot, and the scale is said to be *1 inch to the foot*.

Next draw the scale B on the B.B. Tell the class it represents 6 feet. Measure it—it is 3 inches, or 6 half-inches. Then every half-inch represents a foot, and the scale is said to be *a half-inch to the foot*. Deal with C in the same way, which will be found to be *one quarter of an inch to the foot*.

The class should now be exercised on their slates in drawing easy scales to the teacher's dictation, every exercise being demonstrated on the B.B. and then corrected by the teacher.

- (c) They are now ready for the next step, *viz.*, to draw a plan of the *school-room floor*. Measure up the floor. Suppose its dimensions to be 40

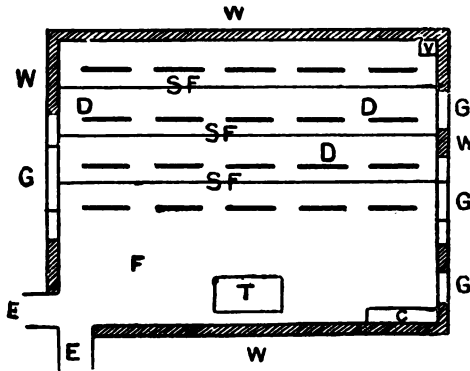
feet by 24 feet. Let the class suggest the scale. If unsuitable scales are suggested, correct and explain their unsuitability. Take one quarter of an inch to the foot as your scale. Then ask the class to give you the length of the lines—10 inches by 6 inches. Correct and explain all errors. Then draw the plan on the B.B., and afterwards let class draw it on their slates. Suitable exercises should follow this step, as in other cases, and such exercises should be varied.

- (1) The dimensions should vary with the same scale.
- (2) The scale should vary with the same dimensions.
- (3) Both scale and dimensions should vary.

III. Plans of the School and District.—The class should now be ready to draw with intelligence those plans laid down for them in the Code. The order to be observed naturally suggests itself, and should be adhered to, *viz.* :—

1. Plan of the classroom.
2. Plan of the school.
3. Plan of the school district.

1. Plan of the Classroom.—It will be advisable in every case for the teacher to make a plan of his (or her) own classroom. The room and its furniture should be measured up in the presence of the class; the dimensions should be dictated to the class as they are made, to be written on their slates, and then the plan should be drawn on the B.B., the dimensions being given by the

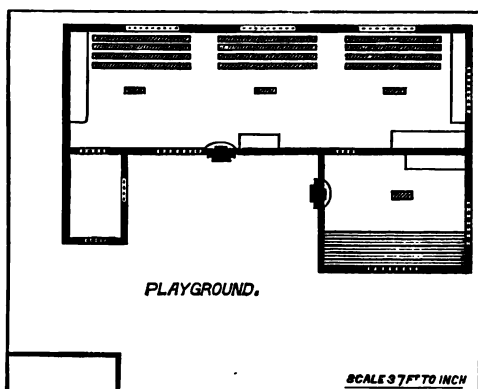


children. The children should then be directed to copy the plan on their slates, learning the dimensions at the same time. They should also be taught to affix a lettered description. It is perhaps unnecessary to remind the teacher that ornateness and superfluous detail should be omitted. The plan must be simple, so as to bring it within the understanding and slender artistic capacity of the children. The size of the room will fix the scale.

Lettered description—

W	equal Walls.	G	equal Windows.
E	Doors.	F	Floor.
S F	Stepped Floor.	D	Dual desks.
C	Cupboard.	V	Tobin ventilator.
T	Table.		

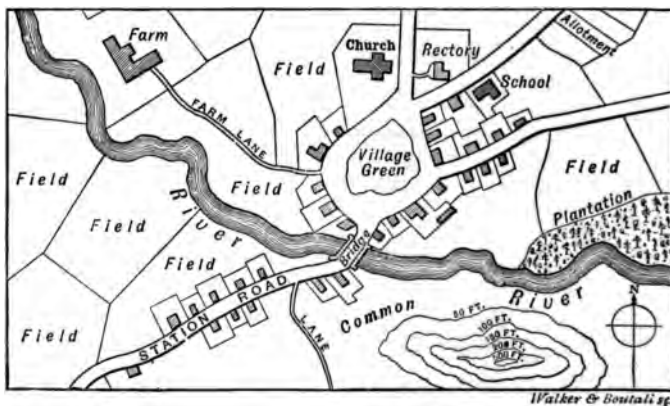
2. Plan of the School.—This can be dealt with in exactly the same way as the plan of the classroom. There is more work, but the process is exactly



the same. The drawing should be neatly done, roughly to scale, and the points of the compass should be inserted to denote the aspect of the school.

3. Plan of the School District.—The process is still the same, with two exceptions:—

(a) The scale is only approximate, and is roughly guessed very often,



although there is no reason why it should be so. The teacher could make a drawing to scale from some copy, and then dictate the dimensions.

(b) The scale has to be very small because of the wider area covered, and the cardinal directions of the various roads and streets have to be known and shown.

IV. Maps and Plans.—Perhaps the chief object in teaching

plans is to give the scholars an intelligent idea of the map. In this sense all these lessons on plans are preparatory lessons to map drawing. The connection between the two must be pointed out and used, and subsequently their differences demonstrated. Lead gradually up to the more difficult conception of a map, and for this purpose proceed as follows :—

1. Draw a Plan of Some Simple Objects.—Lay the B.B. on the school table and draw the plan on it in this position—say of the *pencil box*, or a *slate* or *ink-stand*; or, better still, draw the plans of all of them. Then place the B.B. on the easel. The children see the point at once. The B.B. should really lie in a



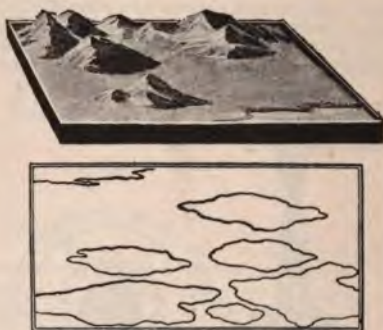
horizontal position. Why does it not? Then the vertical position on the easel is a mere matter of convenience, to enable all the class to see more easily and more effectually.

2. Draw a Plan of a Flat Geographical Model.—Get some clay and some water. Spread out a thin surface of clay in a shallow trough. Mark out the course of a *river* and a *lake* in the clay, and pour a little water into them. Again lay your B.B. on the table or on the floor, and draw the plan of the



model. As this will be the first irregular object submitted to them for its plan to be drawn, a little more assistance may be required. Then, as before, raise the B.B. on the easel, and let the children compare the object with its plan. Represent the river by a line only, as in that form they are found on the map.

3. Draw a Plan of Some Mountains.—Make models of *several mountains* upon the table, in sand or clay. Place the B.B. on the table or floor again. Let several of the scholars come out, look straight down on the model, and then say what they see. A little more illustration may be necessary here. Give as



much as is required. Then draw the plan, and raise the B.B. on the easel. The model and the plan should then be compared by the class. The teacher should now sketch the methods adopted to represent mountains in maps, and should then ask the class to point out some mountain on a school map which could be placed in front of the class. They might also be asked to point out any lakes or rivers on the map.

4. Combined Plan.—A model might now be rapidly made showing *moun-*



tains, river, and lake. This should be explained in the same way as the other plans.

5. Insert the Points of the Compass.—The points of the compass—N., S., E., and W.—should now be fixed upon the plan. For this purpose the B.B. should be placed on the table or floor with the top of the B.B. pointing the same

way as the N. point of the compass. This can easily be done, as the compass points are usually painted upon the ceiling of the schoolroom. If not, fix the S. point first, and proceed as directed in the lesson upon the points of the compass.

6. Lines.—These might now be taught and explained. A plan of the table could be drawn again, and lines at regular intervals could be drawn on the table both lengthwise and crosswise. Their use could then be indicated. Number them. Let the class imagine that the table represents an ocean. The lines help to define a position, and to locate it. Apply this illustration to maps. Be careful to explain that the lines are mere matters of convenience, that they exist on the maps and globes only, and are not found on the earth itself. A blank map might next be taken, and lines drawn upon it, and their use will be obvious.

7. Scale of Miles.—The class will easily understand now that maps are drawn to scale. The scale of miles affixed to every map might now be pointed out, and some useful exercises given.

- (a) The teacher to find out the scale to which the map is shown. Suppose the line showing scale of miles to be three inches long, and to represent 6 miles. The class will at once see that the scale is half an inch to the mile.
- (b) The teacher might take some well-known towns and measure their distance from London. Assuming the scale to be one quarter of an inch to the mile, the teacher measures the distance between the two places and finds it forty inches. The distance is then 160 miles.

V. Difference between a Map and a Picture.



Map.	Picture.
<ol style="list-style-type: none"> 1. A map is a <i>plan</i>. 2. A map has not the same effects of light and shade as a picture. 3. A map shows a view from one particular position—from above. 4. A map has imaginary lines, such as latitude, longitude, etc. 5. Roughly speaking, a map appeals to the eye only. 	<ol style="list-style-type: none"> 1. A picture is an <i>elevation</i>. 2. Both may or may not have colour, but the picture excels in the other respects. 3. A picture shows things and places as they appear to the eye in <i>general</i> positions. 4. A picture has no such lines. 5. A picture appeals to the eye and to the emotions. Both map and picture may appeal to the taste, but the picture will do so to a greater degree.

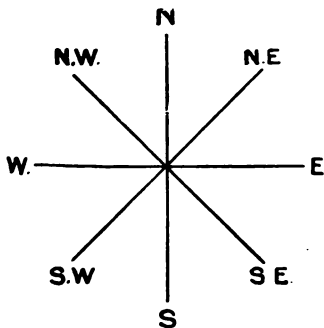
HOW TO TEACH THE POINTS OF THE COMPASS.

1. Fix the South.—Wait for a suitable day, and then turn to the sun at mid-day. Explain south as meaning the sun quarter, and from this find all the other cardinal points in the following order: N., E., and W. Do *not* start with the N.

2. Fix the Directions in the Schoolroom.—Mark them, with their initials, on the floor or walls. In London Board schools they are painted on the ceiling. In Glasgow they are fixed by means of brass bars inserted in the granolite at the school threshold.

3. North.—Show how the top of the map is N. To do this lay the B.B. on the floor, and mark there the true directions thus found. Then place the B.B. on an easel, and show how N. comes to be at the top, but explain that N. does not mean up higher than the rest; that the existing arrangement is merely one of convenience.

4. Other Points.—Explain the principle of naming the other points. Describe each by means of the two bounding it; *e.g.*, N.E. means some spot between the N. and the E. It is both N. and E., and is therefore said to be N.E. So with the other points, N.W., S.W., and S.E. Then proceed to finer differences such as W.N.W.; *i.e.*, between W. and N.W. In this way work out all the points of the compass.



5. Compass.—The compass itself should now be introduced

to the class. Explain the word compass by showing that its points *compass the circle*, and the earth is circular in shape. The class will then see why its points are called points of the compass. Deviation and the magnetic qualities of the compass should form a later lesson. A "model" compass might be built by the teacher in front of the class, and with a little preparation and ingenuity each child might also make one at the same time.

SHAPE AND SIZE OF THE EARTH.

I. Its Shape.—This has to be taught to children in Standard II., but its position in the syllabus is a mistake. Children are not as a rule capable of making the necessary inferences from the only facts or illustrations that can be presented to them. The following proofs are usually given :—

1. The disappearance of ships beneath the horizon.
2. The earth's shadow on the moon.
3. The shape of the sun and the moon.
4. The circular shape of the horizon.
5. A greater altitude means a greater horizon.
6. Going "round" the world.

The railway proof is omitted as being beyond the average child, and more or less this is true of some of the other proofs. Pictures or sketches should be shown in illustration of each proof.


II. Its Size.—The size of the earth is never much more than a mere abstraction to the young children of Standard II., whatever the teacher may do in the way of objective teaching. The estimation of size is defective in most people, and in children especially so. The information imparted will embrace the size of the *circumference*, the *two diameters*, the *total area*, the *area of the land*, and the *area of the water*. The earth might also be roughly compared with the size of the *sun* and *moon*. But *time* will be the chief aid to the teacher, and the best impressions of any large area will be gained by stating the time it would take the class to *walk* over it. The size of the various objects in the room should be estimated and measured if necessary. The estimates could then proceed to the school, the street, the town, and so on, leading finally up to the size of the earth. As soon as you get beyond the town or the village, you transgress the bounds of their experience; hence any reference to county, country, or continent is not recommended. It is a mere attempt to measure one abstraction by another. If railway journeys are used as the standard, they are the experience of the few, and are rarely

coincident. Then follows the necessary correction to the staple test of walking, and an extra and superfluous difficulty is thus added. In estimating these mighty distances, the deepest and most intelligent impression is made by an illustration or experience within the knowledge and grasp of all.

GEOGRAPHICAL DEFINITIONS.

So far as possible, these should be taught *objectively*. A free use should be made of *models*, which should be the work of the teacher or some member of the class. *Pictures* and *diagrams*, of which there are now plenty in the market, should be brought in to assist. In every case the teacher is advised to commence the lesson with an effort to develop the idea of the particular land or water division to be defined, and to furnish plenty of examples so that the definition when it comes should be the work of the class itself. The completeness and accuracy of the definition or description given by the children will be the measure of the teacher's success. Any errors should lead to a recapitulation of that portion of the lesson which is responsible, and such recapitulations should be given until the class shows a sound and accurate idea of the subject of the lesson. A lesson on Capes follows as a typical illustration of the method of giving these lessons, and the adoption of some such style of teaching will enable the young teacher to remove that dull, mechanical, rote aspect which has been so characteristic of these lessons in the past.

LESSON ON CAPES.

Information.	Teaching.
<p>I. Develop the Idea of a Cape.</p> <p>Definition.</p> <p>A cape is a piece of land sticking out into the sea.</p> <p>II. Kinds of Capes.</p> <p>Capes are known by different names, according to the forms which they assume.</p> <ol style="list-style-type: none"> 1. Cape. 2. Bill. 3. Naze or nose. 	<p>I. By the aid of the shallow dish, some clay and some water, demonstrate the idea of a cape. Then show a picture of a cape</p>  <p>Then ask the class to give a definition of a cape.</p>

LESSON ON CAPES—*continued.*

Information.	Teaching.
<p>4. Head.</p> <p>5. Foreland.</p> <p>6. Point.</p> <p>7. Promontory.</p> <p>Examples of Capes.</p> <p>1. Heads—Flamborough, Spurn.</p> <p>2. Ness—Naze, Foulness, Dungeness.</p> <p>3. Foreland—N. and S. Forelands.</p> <p>4. Bill—Selsea, Portland.</p> <p>5. Point—Hartland, Start, Lizard.</p> <p>6. Capes—Wrath, Clear.</p> <p>III. Formation.</p> <p>1. By waves, which wear away the land from high to low water mark.</p> <p>2. The soft rocks wear quickly; the hard rocks slowly. Hence we get <i>bays</i> where the rocks are soft, and <i>capes</i> where they are hard.</p> <p>3. By the action of the atmosphere. The air has a wearing effect upon stones.</p>	<p>II. The teacher should take some clay and rapidly make rough small models of—</p> <p>1 and 4. A <i>head</i> or <i>cape</i> (<i>caput</i>, a head).</p> <p>2. Of a bird's <i>bill</i>.</p> <p>3. A <i>naze</i>, <i>ness</i> (or <i>nose</i>).</p> <p>These should all be affixed to the edge of the mass of clay, which should be placed in the trough or dish, and water poured around the clay.</p> <p>5. Another bit of clay should now be affixed <i>before</i> or in front of the mass of clay. This will illustrate a <i>foreland</i>.</p> <p>6. A <i>point</i>.</p> <p>7. In another place a high cape might be built of small stones. The idea of <i>prominent</i> should then be developed by contrast, and the name <i>promontory</i> given.</p> <p>The class should be led to observe that <i>all the names embody one common idea</i>—of projecting or sticking out like a head does from a body, a nose from a face, etc. The teacher should then take a <i>map</i> and point out these capes upon the map. He should then enlarge them on the B.B., using <i>coloured chalks</i> to mark the land and water, and calling attention to the suitability of the names.</p> <p>III. Teach experimentally.</p> <p>1. Heap up some <i>sand</i> in the dish or trough. Take a funnel and fill it with water. Let the water run on to the sand. The class to note and state the result. The sand, being soft stone, wears or washes away.</p> <p>2. Repeat the experiment with stones. The class to note that apparently there is no wearing away.</p> <p>3. Refer to any old local building. If the locality has none, refer to a well-known one. Show a <i>picture</i> of it if possible. The stone of the building is <i>worn</i>. Compare with a new building, which is seen to be <i>not worn</i>. Tell them that the air has worn away the old building. In years to come, depending upon the kind of stone, it will wear away what is now the new building. Illustrate by a reference to the respective conditions of the mortar in an old brick house and a new one.</p>

HILLS AND VALLEYS.

These should be taught together, for each is the natural complement of the other. They should be taught objectively. For this purpose a clay model of some well-known or suitable district should be made, such as the Downs of Kent and Surrey. The map should afterwards be brought into use, and well-known ranges of hills, with their adjacent valleys, should be pointed out

and briefly described. In making out the notes of lessons on such a subject, the model should be sketched and the map drawn.

The common experience of the children, as based on observation, should be utilised. Every shower of rain affords material for the teacher. The wearing effect of the rain upon the roads can be pointed out, or rather drawn from the children. A little suggestive questioning will suffice. Rain water is tolerably pure ; but the streamlets running from the roads into the gutters are dirty or muddy. The children will see at once that the rain is thus wearing away the road. A reference to the usually worn condition of ground beneath a water tap, a pump, or a spout will illustrate the same thing. A reference might also be made to the beds and channels of rivers, although, so far as the Code is concerned, perhaps this reference would be a little too premature. On such concrete examples as these the imagination might fairly be set to work to conceive the vaster and mightier effects as displayed in the formation of valleys. The connection between hills and valleys will thus be demonstrated.

Other forces assist. The rain and the river have their auxiliaries. The frost hardens, cracks, and loosens the surface material, and sometimes acts in mightier ways still. Snow is another agent. As frozen rain, it does much the same work as rain in swelling the volume of our rivers and lakes ; in wearing away our roads ; and in mountainous districts bringing down masses of earth and rock sometimes in its avalanches. In its frozen and condensed form, layer upon layer accumulating through centuries, it forms the glacier, which is a mighty manufacturer of valleys. The tides, with their persistent wash of the ebb and flow, are another denuding agency.

Land is sometimes elevated by internal forces. This is a positive force in the formation of hills, and instances of raised districts (*e.g.*, sea beaches) should be given.

The transition from hills to mountains is easy and natural. After hills and valleys are thoroughly understood, lessons on mountains should be given. These lessons may be given from different standpoints, but one method is suggested in the following sketch :—

MOUNTAINS.

Information.	Teaching.
<p>I. Description. A large mass of earth and rock rising above the common level of the earth or adjacent land; an elevated mass higher than a hill.</p> <p>II. Arrangement.</p> <ol style="list-style-type: none"> 1. Range. 2. Chain. 3. Group. 4. Isolated Heights. 	<p>I. The class will be able to say what a mountain is from their lessons on hills and from their general knowledge. Something like what is opposite will be given. The teacher should work up the answers of the class into some such form as that given.</p> <p>II. Explain "Range," and compare with— 1. and 2. "Chain." The names are interchangeable; e.g., Pennine Chain or Pennine Range. Point out other ranges on the map—Devonian, Cambrian.</p> <p>Show a clay model of range, or, failing that, sketch a range on the B.B.</p> <p>3. Point to the Cumbrian group, and con-</p>

*Examples.*

1. Cambrian Range.
2. Pennine Chain.
3. Cumbrian Group.
4. Wrekin.

III. Uses.

- (a) Supply pure and bracing air.
- (b) Protect from injurious winds.
- (c) Influence temperature.
- (d) Induce exercise.

trast with the Pennine Range. The boys will see that the arrangement of the mountains settles or determines the class name.

4. Point to the "Wrekin" in Shropshire. Tell class mountains are rarely isolated or detached.

III. Question these facts out:—

1. (a) Ask for holiday haunts—Seaside, Switzerland, etc. People go to Switzerland for good air, good scenery, etc. Question out, if possible; if not, tell class:—

(1) Air is pure and bracing on mountains, because of its altitude.

(2) Because far removed from manufactures.

- (b) and (c) Point out Cheltenham and Bath

MOUNTAINS—continued.

Information.	Teaching.
<p>2. Wealth.</p> <p>(a) Animal, vegetable, and mineral.</p> <p>(b) Supply water power.</p> <p>3. Watersheds.</p>	<p>on the map. Show the hills around. Tell of the higher temperature. Ask or tell of the prevailing winds. Class will see that the hills keep off the bad winds.</p> <p>(d) Give a little information about mountaineering.</p> <p>2. A reference to some well-known dis-</p>



A watershed is elevated land separating two or more river basins.

4. Political uses.

- (a) For defence.
- (b) Form natural boundaries.

tract will easily illustrate this. The nature and general use of each class of productions will be readily drawn from the class.

3. Take a blank map of England and sketch in the Pennine Watershed. Explain shed. (Refer to the parting of the hair.)

4. (a) A reference to the N.W. frontier in India; to the Alps; to the Pyrenees will illustrate this.

(b) Pyrenees a good example.

A later or more advanced lesson on mountains might deal with their *origin*. The subject matter of such a lesson would be most profitably given to a higher class, as the mental demands made are considerably greater than in the previous lesson; and probably at least two lessons would be required to deal with the subject satisfactorily, but this will depend upon the skill of the

teacher. The subject might be dealt with in some such way as follows:—

Origin of Mountains.

1. Upheaval or Elevation.—At successive epochs the earth's crust has been broken up and elevated, whilst various igneous rocks, the most superficial of which is probably granite, were lifted up and forced into the cracks of the disturbed crust. To enforce this fact upon the class, the teacher should bring the following proofs of elevation under its notice:—

- (a) The existence of rocks above the sea level, which were once below it.
- (b) The shells of shellfish, etc., attached to rocks now above the high water mark.
- (c) The beds of old channels getting higher till they at last appear above the surface of the water.
- (d) Raised sea beaches, sometimes several hundred feet above the sea level.
- (e) Buildings once close to the shore now miles inland.

The teacher should take a map and point to places where evidences of elevation are to be seen, such as—

- (a) The Essex beach.
- (b) The south-west of England.
- (c) South of South America.
- (d) The shores of the Mediterranean.
- (e) The shores of the Red Sea.

2. Depression.—The following evidence should be submitted:—

- (a) The encroachment of the sea upon the land.
- (b) The sinking of rocks once above the surface.
- (c) The gradual deepening of channels.
- (d) The formation and existence of barrier reefs and atolls.
- (e) Submerged forests.

The teacher should then point out that these movements of elevation and subsidence seem to be most active in those districts where volcanic and earthquake phenomena are most frequently observed, and that the great moving force is the heat stored up in the earth's interior.

The teacher should again turn to the map and point to the depressed district in the south of Scandinavia; to the submerged buildings along the coast of South Greenland; and to the submerged forests around our own shores. He might also tell the class that the coast of South America, along the mouth of the Amazon, and in the south-east portion of the continent, is now being slowly submerged. In pointing out these districts of elevation and depression, he might call attention to the fact that they are often earthquake and volcanic districts. A sketch of a volcano should be made upon the B.B., and its internal heat, the subterranean interformation of steam, and the tremendous force it exerts, should be explained. Such facts will make the points intelligible to the class.

The effect of *denudation*, both sub-aerial and marine, might be

pointed out, whilst the work of the various agents like the sun, cold, frost, the atmosphere, rain, rivers, and the sea should be explained.

RIVERS.

The chief points to be noticed in giving a lesson on rivers are here enumerated, but it is not suggested that *every* lesson should contain all the information specified. The time allowed and the class must be the chief determining factors. The points should always be introduced in the order recommended, so as to preserve the proper sequence in teaching—from the more known to the less known. Children may see a river day by day, and may also see its various uses exemplified. They probably know little or nothing about its formation, and therefore this should generally come last. We will take the Thames as an example.

1. **Uses.**—It is a great *commercial highway*; ships laden with goods from all parts of the world pass up and down it continually. Many *trades* are carried on along its banks, whilst with its steamboats it affords a pleasant means of *communication* between one place and another. It contributes to the *water supply* of the people, for some companies draw largely from it; whilst the fish caught at its mouth and in its upper courses increase the *food supply*. In its prettier parts it is even used as a *residential place*, for many house boats are now found upon it. It also affords opportunities for swimming, rowing, sailing, punting, and fishing, while pleasure parties by steam boats or rowing boats swarm upon it. These facts show its *recreative* use to be one of the most important.

2. **Course.**—Follow the course from its source to its mouth, and take the opportunity to teach right and left banks, shore, bed, channel, tributary, mouth, course, basin, estuary, chief towns, bridges, tunnels, and chief ferries.

3. **Formation.**—Describe the circulation of water on the globe—evaporation, condensation, atmospheric phenomena (rain, snow, etc.), the percolation of rain, and the formation of springs. For other rivers it may be necessary to describe the formation of a glacier, and to show that some rivers take their rise from them.

THE BUILD OF A COUNTRY.

In teaching the “build” of a country, first make the class thoroughly understand that the term means the “make,” “form,” or “physical construction” of a country. It will thus practically embrace the physical features of that country; *e.g.*, extent, length of coast line, chief capes and bays, rivers, mountains, lakes and plains. The ordinary method of teaching this branch of the work is bad. Lists of capes, bays, islands, rivers, etc., taught as mere strings of names, with an utter absence of objective and realistic teaching, are worse than useless. Abstract numbers to express extent are very often meaningless. Some district should be taken as a standard, and other countries com-

pared with it. The coast line should be taught by a series of descriptive voyages with the aid of the map and B.B. sketches. Mountains might be compared with some well known or neighbouring hill. Pictorial illustrations, where possible, should be brought into requisition. Boating parties could traverse the rivers if the imagination of the class is properly appealed to, and stimulated by the descriptive powers of the teacher. Mountains could be climbed in the same way, and the views thus revealed described. The narrative element thus introduced would remove the dulness of the usual lesson. On such a method as this a number of geographical problems would naturally suggest themselves, and would aid the training of the faculties of observation and reasoning. For instance, the influence of "build" upon the health, tastes, sentiments, and industries of the country could be deduced. A mountainous people are of an independent nature, and generally religious. Why? The capacity to deal with questions of this sort would be cultivated and developed by the methods suggested. Each item in the "build" would thus become a central objective fact, around which could be grouped a number of vital incidents in the life of the nation. Such work, it is true, will require more thought and preparation than usual, but the outlay will be found a productive one for all concerned.

HOW TO TEACH LATITUDE AND LONGITUDE.

1. Show their Necessity.—Take a suitable ball. Make a mark A upon it, and then ask the children to locate the mark. They cannot. Let the ball represent the earth, and suppose this spot to be placed in some ocean or desert. *They cannot locate it because they have no starting point to fix its relative position.*

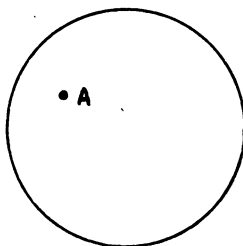


FIG. 1.

2. Find a Starting Point.—For this purpose it will be necessary to fix the polar points and to draw an equator. Proceed as follows:—

- (a) **Fix the Polar Points.** Take a piece of wire of suitable length and run it through the centre of the ball. Then make the ball revolve on this line, which is called an **axis**. Refer to the axis of a cart wheel as an illustration. The ends of this line are called **poles**. A pole means a

pivot, and the class will see the appropriateness of the name. The children *can* fix the spot A now by reference to its distance from either pole. But it can be fixed more precisely than that.

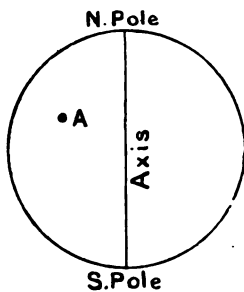


FIG. 2.

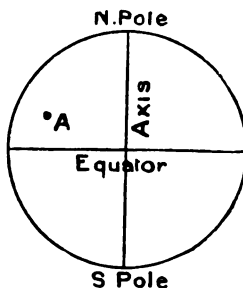


FIG. 3.

- (b) **Draw an Equator.** Compare the word "equal" with *equator*, and tell the class the line is so called because it divides the earth into two equal parts. The point A can now be better located. Its distance from the equator can be given as well as its distance from the poles. Measure its distance above the equator. **This distance is called latitude.**

3. Latitude.—The class can now define latitude as **distance from the Equator north or south.** Draw a line through the point

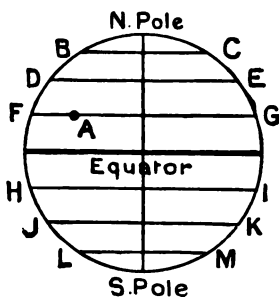


FIG. 4.

A *parallel* to the equator. This is called a **parallel of latitude**. There can be any number of them, as BC, DE, etc. Any spot we may wish to locate will have one of these parallels of latitude drawn through it, so as to fix its distance from the equator. The lines go right round the earth parallel with the equator, and *all places on the same line have the same latitude.*

4. Degrees.—The earth is 25,000 miles round the equator, which is divided into 360 parts. Each part is called a *degree*. Make the class quite understand that this is an arbitrary number, and it might have been 100, 500, or anything else. It was chosen because it is divisible by all numbers from 1 to 12 except 7 and 11. This fact should be told. A little problem then might be given asking how many miles there are in a degree at the equator, *e.g.*, $25,000 \div 360 = 69'39$ miles. Then let the class compare the parallels of latitude with

the equator—they decrease as they reach the poles; but as every circle on the globe is divided into 360° , the number of miles in a degree on a parallel of latitude varies with its position. At London, the number of miles in a degree on London's parallel of latitude is about 69.10 ; at the poles about 68.69 .

The reason for this slight variation is that the earth is not a perfect sphere. It is flattened a little at the poles, and bulges out at the equator. The difference between the equatorial diameter and the polar diameter is 26 miles.

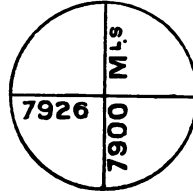


FIG. 5.

5. Longitude.—Ask the class to tell you how far east or west the spot A is. They cannot, because they again have no starting place. Suppose we fix on some place as a starting point—say Greenwich. The choice again is an arbitrary one. Now we can say how far east or west A is from Greenwich. If G be the position of Greenwich, draw a line round the ball passing through the two poles and the point G. This line is called a **meridian**, because all places along it have midday at the same time. Draw a diagram on the B.B. illustrating this. All the places *a, b, c, d, e*, along the meridian N.S. have midday at the same time. **Meridian, then, means midday line.** Now we can say that the point A is so far (measure distance) west of Greenwich. This line through Greenwich is called the *first meridian*, because it is the point fixed upon to start from. The class should now give a definition of longitude.

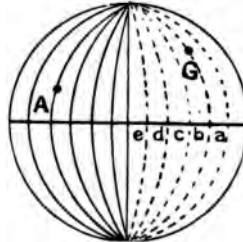


FIG. 6.

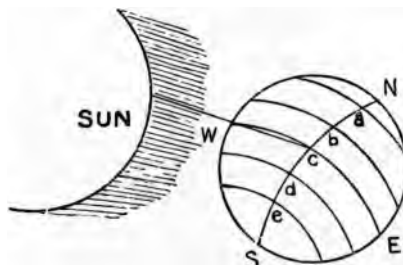


FIG. 7.

6. Meridian Lines.—Mark points along the equator at equal distances (Fig. 6). Through these points and the poles draw circles. The children should be invited to notice that they are

not parallel, hence *there are no parallels of longitude*. The circles are called meridians for the reason given. These meridians are also divided into 360° , but as they are all the same size, **a degree on a meridian of longitude always contains the same number of miles.**

7. How to find Latitude and Longitude.—The position of A will be fixed by drawing through it—

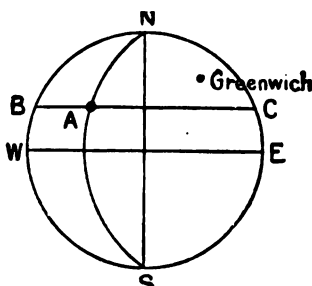


FIG. 8.

- (a) A parallel of latitude BAC.
- (b) A meridian of longitude NAS.

The intersection of these two lines at A locates it. The spot A is so many degrees W. longitude, and so many degrees N. latitude. But when a ship is at sea, it is not possible to *measure* this distance, as children usually understand the word *measure*. Explain the method adopted as follows:—

(a) **Latitude.**—This is fixed by the relative position of the polar star by night, and by the altitude of the sun by day.

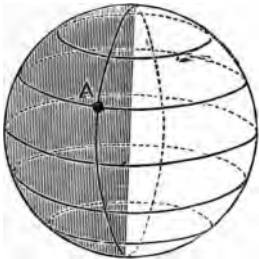

1. **By Night.** Tell the class that the pole star is always the same number of degrees above the horizon as the observer is removed from the equator, so that the height of the pole star gives the latitude of the observer. Now, the height of the pole star *can* be measured. (Reserve the method how for another lesson.) If a person travelled 10° northward, the polar star would appear to rise 10° .
2. **By Day.** The measurement is most often made by day, and then the altitude or height of the sun is used instead of the pole star.

(b) **Longitude.**—All ships carry chronometers. These keep accurate Greenwich (the starting place) time. Suppose the height of the sun shows it to be 10 a.m. where the ship is, when it is 3 p.m. by the chronometer. A distance of 15° is allowed for each hour, because $360^\circ \div 24 \text{ hours} = 15^\circ$ for each hour. Then the longitude is 15° for every hour's difference in the two times; *i.e.*, it is $5 \times 15^\circ = 75^\circ$ W. longitude. The longitude is W., because the time by the sun is in *advance* of the time by the chronometer. Again, suppose the sun to show it to be 4 p.m. and the chronometer 10 a.m. Then the longitude $6 \times 15^\circ = 90^\circ$ E., because the time by the sun is *after* the time by the chronometer. Give plenty of examples, and do not forget to tell the class that all these lines are *imaginary*.

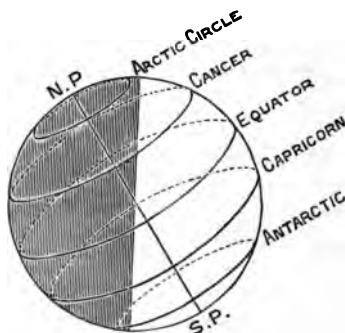
A subsequent lesson should be given showing the method of taking observations in greater detail.

A LESSON ON DAY AND NIGHT.

Perhaps there is no more frequently recurring lesson in the whole range of school geographical teaching than the above. It figures frequently in examination papers, and finds a place in nearly every scheme of lessons in geography. These two facts are a practical way of emphasising its importance. Furthermore, the lesson is not an easy one for young teachers, hence it has been thought advisable to give it in detail.

Matter and Material.	Method.
<p>I. LIGHT AND DARK.</p> <p>Demonstrate this with a globe and a candle lamp.</p> <p>Globe to represent the earth. Candle to represent the sun.</p>	<p>I. 1. The class should observe that half the globe is <i>lighted</i>, and half not lighted; <i>i.e.</i>, in the <i>dark</i>.</p> <p>2. Turn the globe into other positions, and let the boys observe that the result is the same—one half in the light and one half in the dark.</p>
	
<p>The earth turns round on its axis once in 24 hours, one half being turned towards the sun (<i>day</i>) and one half being turned away from the sun (<i>night</i>).</p> <p>II. SUNRISE AND SUNSET.</p> <p>The interval of light gives us <i>day</i>. The interval of darkness gives us <i>night</i>.</p> <p>Sunset, sunrise, midday, mid-night, are other points in the course of the daily motion of the earth.</p>	<p>3. Next mark <i>any</i> spot on the surface of the globe. Now revolve the globe slowly until that spot takes up its original position. They will then see that every spot is for half its course in the light and for half its course in the dark.</p> <p>The light part equals day. The dark part equals night.</p> <p>II. Mark any spot A on the dark side of the earth. Then slowly revolve the globe round its axis, calling attention to the position of the mark—</p> <p>1. When it is just quitting the dark part to come into the light—<i>break of day, dawn, sunrise</i>.</p> <p>2. When it is halfway round the light portion; <i>i.e.</i>, when it is right opposite to the candle—<i>noon</i> (explain), <i>midday</i>.</p> <p>3. When it is just quitting the light for the dark—<i>sunset</i>.</p>

Matter and Material.	Method.
<p>III. MOVEMENTS.</p> <p>1. Apparent Movements.</p> <p>The sun seems to rise every morning, travel across the heavens from east to west, and then set. This seems to cause day and night.</p> <p>2. Real Movements.</p> <p>The earth turns round on its axis once every 24 hours, and causes the sun to appear to move.</p> <p>IV. VARIATIONS IN DAY AND NIGHT.</p> <p>1. In the summer the days are long and the nights are short.</p> <p>2. In the winter the nights are long and the days are short.</p> <p>3. In spring and autumn the days and nights are more equal in length.</p>	<p>4. When it is halfway round the dark part; <i>i.e.</i>, farthest away from the sun—<i>midnight</i>.</p> <p>The course of the sun from sunrise to sunset gives us <i>day</i>; from sunset to sunrise, <i>night</i>.</p> <p>III. 1. Refer to a railway train; the trees, etc., seem to be running away from the passengers.</p> <p>2. If two trains are in a station, and one is moving out whilst the other is stationary, a person looking out of the window of a carriage of the stationary train on the side towards the moving train, will fancy <i>his</i> train is moving and the other not.</p> <p>3. In rising in a balloon, the earth seems to sink away from you.</p> <p>These are all <i>apparent</i> motions. The real motion is understood in each case. Apply this to the earth, which turns round on its own axis, and thus causes the sun to appear to move.</p> <p>IV. Reference has hitherto been made to the days and nights as though they were always of equal length—twelve hours. This is incorrect, and the information given opposite, which expresses the real case, can easily be obtained by questioning.</p> <p>The explanation of the phenomena expressed in IV. (1, 2, and 3) is as follows:—</p> <p>By observation the class should notice—</p> <p>1. The Arctic Circle rotates entirely in the dark, hence it is <i>winter at the North Pole, and constant night</i>. It is beyond the direct light and heat of the sun.</p>



The earth's axis is inclined to its orbit at $23\frac{1}{2}^\circ$, and this will explain the difference in the lengths of the days and nights at—

Explain orbit, and draw a diagram illustrating.

2. The Antarctic is the reverse, being wholly within the light and heat of the sun. Hence it is summer in the *southern hemisphere*.

Matter and Material.	Method.
<p>1. Different latitudes at the same time.</p> <p>2. The same latitudes at different times.</p> <p>In summer any given place is turned more directly towards the sun's rays; in the winter it is turned more directly away from the sun's rays.</p> <p>Twilight might be deferred to another lesson.</p> <p><i>N.B.</i> — The student might afterwards prepare a lesson on the <i>seasons</i> on similar lines.</p>	<p>3. The farther we proceed from the North Pole to the Equator, the nearer we approach the sphere of light, until, at the Equator, we have the days and nights equal again. The result will be that <i>the days lengthen as we get nearer the Equator.</i></p> <p>4. Now proceed from the Equator to the Antarctic Circle, and the region of light increases: <i>i.e.</i>, the amount of light is more and longer, <i>giving us longer days.</i></p> <p>5. The class should again be asked to notice that it is winter in the northern hemisphere, and that on any given parallel of latitude (say Cancer) more of that parallel is in the dark than in the light; and this is true of all parallels until we reach the Equator; <i>i.e.</i>, <i>the nights are long and the days short in the winter.</i></p> <p>6. In the southern hemisphere it is summer. There the greater portion of any given parallel is in the light (day); <i>i.e.</i>, <i>the days are longer in summer and the nights shorter.</i></p> <p>Hence <i>the days and nights vary in length at different latitudes at the same time.</i></p> <p>To prove <i>they vary in the same latitude at different times</i>, take any town (London). Appeal to the experience of the class. Days and nights do vary at different times. Why? Because the position of London with respect to the sun is different in the summer and winter.</p> <p>This might be illustrated by a B.B. diagram.</p> <p>This lesson might be well illustrated with the <i>tellurian</i> or the <i>terrestrial time globe</i>, if they should be accessible.</p>

CLIMATE.

1. Meaning.—In dealing with climate the teacher should commence by giving the class a clear and accurate idea of what the term now embraces. For this purpose he should invite definitions or descriptions from the class, and seek to gather up all the correct items into one statement. He might assist by giving the derivation (*klima*) and its meaning. He might point out that the word really means a slope or inclination, and that the inclination referred to is the obliquity of the sun's rays. But the term embraces more than this, including as it does not only the temperature of a district, but its meteorological conditions generally.

2. Latitude.—(a) *The effect of the sun's rays is greatest where they fall perpendicularly on the surface of the earth, and diminishes as their obliquity increases.*

(b) The *surface* covered by the oblique rays is greater than that covered by the perpendicular rays.

(c) There is more *absorption* in the oblique rays, because the sun has to traverse more air particles, and as a result more is absorbed. Both these facts are clearly demonstrated in Fig. 1 of the lesson on climate which follows.

(d) The *slope* is important ; to the south it is warmer than to the north. This is true of all latitudes.

These are the main points which the teacher will have to put before the class to give a clear conception of the influence of latitude on climate.

3. Elevation.—What is the influence of elevation ? The teacher must point out that the higher we ascend the colder it becomes. Thus *altitude has the same effect as latitude*. But there are modifying circumstances, and the teacher must be careful to point them out. He must make the class understand that *the actual temperature of the air depends not so much upon the direct rays of the sun as upon the radiation from the heated surface of the earth*. He must be supplied with suitable illustrations showing that the mountains may keep off hot or cold winds ; they may chill the winds with their snow caps ; they may bring down the rain by condensing the moisture in the atmosphere ; they may lie across, or in a line with the rain-bearing wind. These facts make the *rainfall* an important factor in climate. The addition of the snow chills, hence the *nature of the surface* is important ; and, as they influence or intercept winds, the *prevailing winds* are of consequence ; whilst it has already been shown that the direction of their *slopes* is a contributing element. Let us consider some of these influences in greater detail.

4. The Nature of the Soil.—The teacher will need to bring the following facts under the notice of his class :—

- (a) A sandy desert, a tract of luxuriant vegetation, an expanse of water radiate heat in very different degrees. The desert raises the temperature of the air much ; the water little. These facts should be illustrated by a reference to the great heat of well-known deserts, and to their extremes of temperature sometimes. A reference to summer visits to the seaside, and a possible reference to land and sea breezes, would emphasise the more equable temperature of water as compared with land.
- (b) A newly ploughed field both absorbs and radiates heat much more rapidly than a grass field.
- (c) But good absorbers are good radiators. Hence the desert cools quickly ; water does not. Why ?
 1. Heat is diffused through a larger mass owing to the depth to which solar radiation penetrates.
 2. Owing to vertical and horizontal currents to great depths.

5. Proximity to the Sea.—We have *maritime climates* and *continental climates*, the temperature of the former being more equable. A few statistics might be quoted in proof of this; e.g., the climate of England might be compared with that of Canada or Russia, the comparison being restricted to parts lying in the same latitude. Again, *oceanic currents*, both hot and cold, are great influences, and the Gulf Stream and the North Polar current might be given in illustration. The amount of the *evaporation* is influenced by the proximity of the sea, and this leads us on naturally to the rainfall.

6. Rainfall.—The points here to be noticed are :—

- (a) Coast countries have more rain than inland countries.
- (b) Mountain regions are wetter than the plains.
- (c) The tropics have more rain than other zones.

Examples in illustration should be given in each case.

7. Prevailing Winds.—Atmospheric currents exercise a greater influence upon climate than oceanic currents. Illustrate by a reference to our own prevailing winds—our warm S.W. and our cold E. winds. Explain the cause in each case.

8. Local Circumstances.—All the influences enumerated may be more or less modified by local circumstances, but the teacher will not experience much difficulty with some of these, as they are almost self-explanatory. Such facts as the following are included :—

- (a) The amount of snowfall.
- (b) Bogs and marshes cool the air, and generate fogs.
- (c) Clay soils retain the moisture, and have the same effects as marshes.
- (d) The relative duration of summer and winter.
- (e) Some kinds of marshes abound in malarious and other exhalations unfavourable to health.
- (f) Large tracts of forests often produce the same results.
- (g) The clearing, drainage, and cultivation of land generally have favourable effects on climate. On the other hand, a too complete removal of forests may prevent the deposition of moisture to such an extent as to cause droughts (W. I. Isles) or even floods (valley of Po).

The teacher should be prepared to furnish examples in illustration of every one of these phenomena.

9. Finally the class might have the distinction between *weather* and *climate* pointed out. Weather is daily; climate embraces an average effect extending over many years.

In the teaching of climate too much must not be crowded into one lesson. The subject is far too wide for that. It will be sufficient if two or three headings are taken up and dealt with thoroughly in each lesson, as in the subjoined instance, which deals only with latitude,

A LESSON ON CLIMATE AS INFLUENCED BY LATITUDE.

Information.	Teaching.
<p>Latitude.</p> <p>This determines the amount of heat received from the sun.</p> <p>1. Places nearer the equator are warmer than those more remote.</p>	<p>It is assumed that the class knows the meaning of the word climate as it is generally used.</p> <p>Facts 1, 2, 3, and 4 can be elicited by questioning. They could be explained by means of the following diagrams, which should be drawn upon the B.B. :—</p>

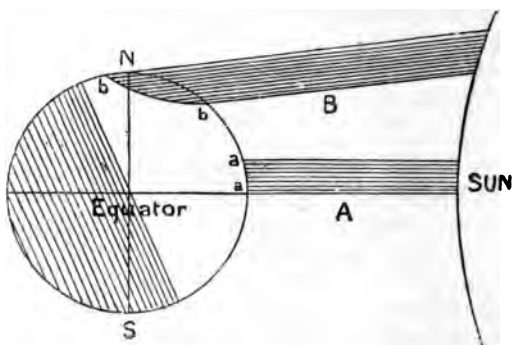


FIG. 1.

2. The day is warmer than the night.

3. Summer is warmer than winter.

4. Mid-day is warmer than morning or evening.

A. Temperature.

By this term is meant the different degrees of heat and cold.

(a) *Annual range.* This is calculated on the average of the varying temperature of the different seasons spread over several years.

(b) *Daily range.* By this is meant the difference between the temperature of day and night.

B. Places having the same latitude may have different climates, e.g. :—

Place.	Latitude.	Average Summer Temperature.	Average Winter Temperature.	Range.
Edinboro	56°	57°	38°	19°
Moscow	56°	64°	15°	49°

Let A and B represent different bundles of equal rays; *bb* is longer than *aa*, hence an equal amount of heat is spread over a greater space. See Fig. 5 also.

Let the light portion represent *day* and the shaded portion *night*. The light



FIG. 2

portion is turned towards the sun, the dark portion away from the sun. As the Earth turns round upon its axis once in every twenty-four hours, and as each half is alternately exposed to the sun for twelve hours (day), and turned away from the sun twelve hours (night), the difference in

LESSON ON CLIMATE AS INFLUENCED BY LATITUDE—*continued.*

Information.	Teaching.
C. If the earth were entirely covered with water, or consisted entirely of land, then the climate of any part would be determined by its latitude, and therefore all places having the same latitude would have the same climate.	<p>temperature between day and night will be obvious.</p> <p>Tell the children that the sun is never so high in the sky during the winter as it is in the summer. Appeal to their experience, and ask if any of them have ever noticed this fact. Then sketch Fig. 3 in illustration. Fig. 4 will explain the reason of this, and should be carefully prepared by the teacher for this purpose.</p>

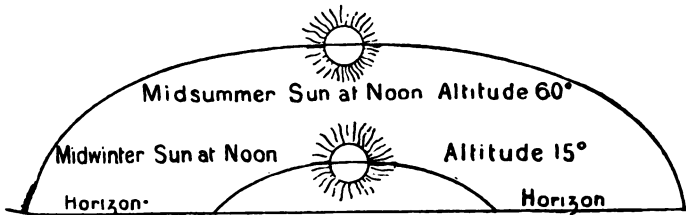


FIG. 3.

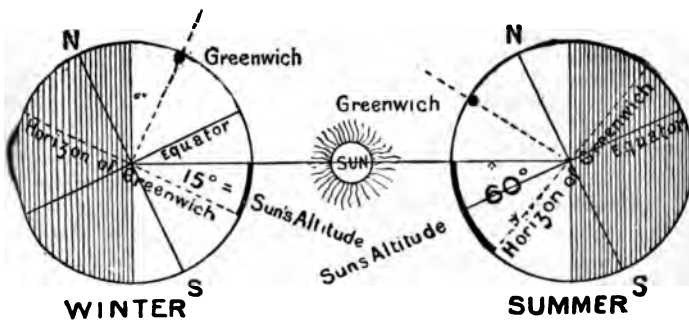


FIG. 4.

D. Case of the Equator.

The days and nights are equal all the year, hence—

1. The heat received by day, and that lost by radiation at night, are Practically constant.
2. As a result there is no marked difference between summer and winter temperature.
3. Hence there is no range of temperature,

At sunrise and sunset the sun is near the horizon, and a pencil of rays (*aa*) is spread over a much greater space than an equal pencil (*bb*) at noon. At sunrise and sunset there is also greater thickness of atmosphere for the heat rays to pass through, and consequently more absorption of heat by the atmosphere.

A. Write A, *a*, *b* upon the B.B., and have them learnt by the class.

B. Then explain and illustrate them by a reference to table B. Write this table on the B.B. Have a map of Europe put up before the class, and let the places be

LESSON ON CLIMATE AS INFLUENCED BY LATITUDE—continued.

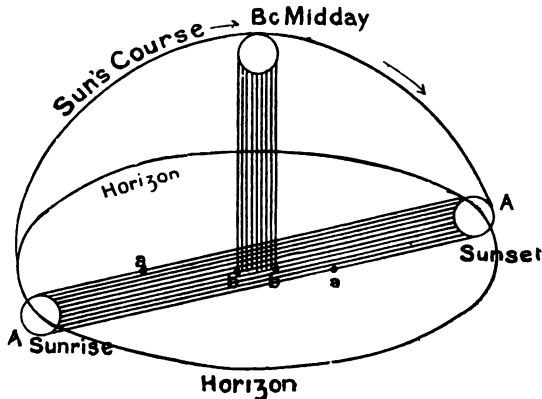


FIG. 5.

Information.	Teaching.
<p>E. 1. Insular Climate.</p> <p>(a) The range is small.</p> <p>(b) The climate is temperate because water surfaces tend to equalise temperatures.</p> <p>2. Continental Climate.</p> <p>A climate of extremes and great range of temperature.</p>	<p>pointed out. The parallel of latitude should be traced from Edinburgh to Moscow to show that their latitudes are the same.</p> <p>C and D. Explain these.</p> <p>E. Elucidate E by a reference to B.</p>

NOTES OF A LESSON ON TRADE WINDS.

In the teaching of winds three lessons stand out as of paramount importance—land and sea breezes, trade winds, and monsoons. As considerations of space prevent the giving of these three lessons in detail, one only, that on trade winds, is given as a type of the method to be adopted. The student should practise himself in writing similar notes on the other two.

Information.	Teaching.
<p>I. Introduction.</p> <p>1. Air, when unequally heated, forms currents, because heated air expands and ascends, and the colder air flows in to take its place.</p>	<p>1. This lesson should be one of a series. Lessons on winds generally, and one on land and sea breezes, should have preceded it.</p> <p>The teacher should briefly recapitulate the truths taught in those lessons.</p> <p>The class will discover, before the lesson finishes, some similarity between this lesson and the lesson on land and sea breezes.</p>

LESSON ON TRADE WINDS—continued.

Information.

2. Land and sea breezes are due to the varying temperature of the air.

II. Origin.

1. The air at the equator, being the most heated, ascends, and begins to move towards the higher latitudes, and in the direction of the poles.

2. At about 30° (N. or S.) this current of air reaches the surface of the earth, and since it has left the air at the equator more rarefied, part of it, mingled with the air from the poles, returns to the equator, while part continues its course to the poles.

III. Direction.

1. The equatorial current or upper trade wind.

- (a) S.W. in N. hemisphere.
- (b) N.W. in S. hemisphere.

2. The polar current or lower trade wind.

- (a) N.E. in N. hemisphere.
- (b) S.E. in S. hemisphere.

The trade winds are deflected to the right in the N. hemisphere, and to the left in the S. hemisphere.

IV. Locality.

1. In N. hemisphere.

- (a) Belt of equatorial calms about 400 geographical miles broad.
- (b) Region of N.E. trade winds.

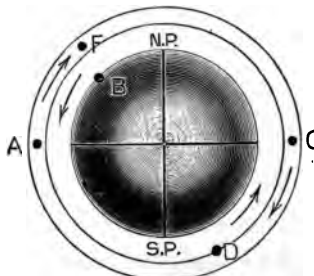
- (1) In Atlantic 8° to 29° N. lat.
- (2) In Pacific 2° to 25° N. lat.

Teaching.

II. 1. Illustrate by a reference to the use of a fire in a room as a means of ventilation as well as warming. A further illustration might be found by a reference to the origin of land and sea breezes. To show that warm air expands and ascends do the air-bag experiment, and refer to the ascent of balloons.

2. Tell this, and illustrate as in III., 1 and 2.

III. 1 and 2. Point out on the map the latitudes referred to. Then sketch the following illustration on the B.B.



The air pressure at A is higher than at B, hence as air flows from the region of high pressure to that of low pressure, a current flows from A to B. This is the equatorial current, or upper trade wind, or counter, or return trade wind.

From diagram show there must be a greater weight of air over A than over F. Hence the movement from A to F.

But the barometer at B soon stands higher than barometer at equator, because of the flow of air in this upper current. Hence the movement from B to the equator. This is the polar current or lower trade wind.

If the earth were stationary these two currents would flow constantly due N. and S. But the trade winds are E. winds. Why?

- (1) The earth rotates from W. to E., and the rate of rotation is greatest at the equator, and grows less as we approach the poles.
- (2) The air has consequently its maximum rate of rotation from west to east at the equator.

When this air enters regions of higher latitudes it reaches districts which are rotating less rapidly than itself, and which therefore lag behind it; while the air, shooting forward, appears as a wind blowing from W. to E. In this way the upper

LESSON ON TRADE WINDS—*continued.*

Information.	Teaching.
<p>2. In S. hemisphere.</p> <p>(a) Belt of calms.</p> <p>(b) Region of S.E. trade winds.</p> <p>(1) In Atlantic 3° N. to 28° S. lat.</p> <p>(2) In Pacific 2° to 21° S. lat.</p> <p>The belt of equatorial calms is frequently the scene of the severest tempests, with heavy rainfalls and thunderstorms.</p>	<p>current in the N. hemisphere becomes a S.W. wind, and in the S. hemisphere a N.W. wind.</p> <p>The converse is the case with the polar current. This enters a region of quicker rotation from a region of slower rotation, and lags behind. It does not rotate so quickly as those parts of the earth near the equator, and is therefore perceived as an E. wind—N.E. or E. in the N. hemisphere; S.E. in the S. hemisphere.</p> <p>IV. 1a and 2a. The S.E. and N.E. trade winds meet near the equator.</p> <p>Anticipated result.—They ought to unite and form a gentle wind blowing to the W.</p> <p>Actual result.—Both are suspended through the strong upward draught produced by the rapid and extensive rarefaction at the equator. This produces the <i>belt of equatorial calms</i> about 400 geographical miles broad.</p> <p>1b and 2b. Point these out on the map. Refer to storms of the belt of calms.</p> <p>A map should be sketched on the B.B. showing the directions of the trade winds, and the position of the belt of calms.</p>

A LESSON ON RAIN.**I. Principles Demonstrated and Explained.**

These should be taught by *observation* and *experiment*.

1. Evaporation.

- (a) Take two tin saucers of equal size with equal quantities of water. Apply heat to one and not to the other, or place one near the fire and the



other in a cool place. *The one supplied with most heat will lose its water first, which will evaporate.*

- (b) Refer to school *ink wells*. The ink in them dries up; *i.e., the ink evaporates.*
- (c) *Cold dry winds* in the spring often bring chapped hands. The moisture of the hands is evaporated by the wind. The natives of Africa, in order to protect themselves from the too rapid perspiration occasioned by the *simoom*, cover themselves with fatty substances.
- (d) The *drying of the clothes* after washing can also be referred to,

2. Condensation.

- (a) Hold a *slate in the steam* issuing from a kettle spout. The slate becomes moist. *The vapour has been turned into water again—it has been condensed.*



- (b) Refer to a *crowded room and the moisture on the windows*. The moisture from the bodies given off in the form of vapour has been *condensed* by the cold glass.
- (c) Refer to a *cold day*. You can see people's "breath"; *i.e.*, the moisture contained in the breath is condensed as soon as it appears from the mouth or nostrils.

3. Application of these Truths.—These truths should then be applied to explain the **formation of rain**. The class should be able to tell the teacher that **rain is formed by the evaporation and subsequent condensation of the water of the earth.**

4. Why Does Rain Fall?—The class will understand the influence of the sun and the formation of clouds from what has already been demonstrated. But why does rain fall?

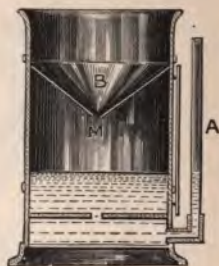
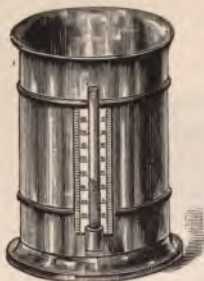
Take two large glass jars and nearly fill them with water. Drop lumps of chalk in one and powdered chalk in the other. The heavy particles in (1) fall; *i.e.*, they sink quickly. The light particles in (2) float.



Apply this fact to the particles of moisture in the air. **The condensed and heavier particles fall as rain.** The lighter particles remain floating in the air as vapour or clouds. Then when a cold wind or cold mountain top or slope further condenses the moisture in the air, it becomes too heavy to remain in suspension, and so falls as rain.

II. The Rain Gauge.—Show one if possible, and explain its action. If not, explain from a sketch on the B.B. "M is a cylindrical vessel, closed at the top by a funnel-shaped lid, in which there is a very small hole, through which the rain falls. At the bottom of the vessel is a glass tube (A), in which the water rises to the same height as inside the rain gauge, and is measured by a scale on the side, as shown in the figure."

"The apparatus being placed in an exposed situation, if at the end of a month the height of the water in the tube is two inches, it shows that the water has attained this height in the vessel, and consequently that a layer of two



inches in depth expresses the quantity of rain which this extent of surface has received."—Ganot's *Physics*.

III. Rainfall.—This is measured by the rain gauge. The amount for each day is registered, and the average taken for the year. This gives the *annual rainfall*. The *average rainfall* can be taken from the average of a number of years. A day is rainy when the rainfall is not less than 'or inch.

To give some idea of the amount of rain that falls put the following statistics on the B.B.

1 inch of rain on a square yard gives 4'679 gallons, or 47'74 lbs.

1 inch of rain on an acre gives 22,662 gallons, or 101 tons.

FURTHER SUGGESTIONS ON THE TEACHING OF GEOGRAPHY.

As it is impossible within the limits of such a chapter as this to set out the methods for the teaching of the many subjects embraced under the term geography, a few further suggestions are made with a view to rendering assistance in the planning out of a few typical lessons. The skeleton of the lesson is provided; the teacher's task will be to fill in the details, to think out his own experiments and illustrations, and to make any modifications in the general outline that special or local circumstances may require.

Lessons on Towns.—Only the most important or the most interesting should be dealt with. One of the worst errors of geography lessons and geography books is the overcrowding of names, and the names of towns generally figure largely in this overcrowding. Having chosen the subject of the lesson, the teacher should proceed to deal with it as follows:—

1. Locality.

(a) Latitude.

(b) Altitude.

(c) Position—coast or inland; river (if any),

2. Climate.

- (a) Maximum and minimum temperature.
- (b) Range of temperature.
 - 1. Daily range.
 - 2. Annual range.
- (c) Prevailing winds.
- (d) Rainfall.

3. Occupations.

- (a) Industries.
- (b) Commerce.
- (c) Agriculture (crops).
- (d) Minerals.

4. Population.

- (a) Present population.
 - (b) At last census.
 - (c) Health ; death rate ; reasons for high or low rate.
 - (d) Religion.
 - (e) Social life ; houses ; dress ; amusements.
- } Rate of increase or decrease.

5. Communications.

- | | |
|--|--|
| (a) Land. <ul style="list-style-type: none"> 1. Rail. 2. Trams, etc. 3. Roads. | (b) Water. <ul style="list-style-type: none"> 1. Rivers. 2. Canals. 3. Trade routes. |
|--|--|

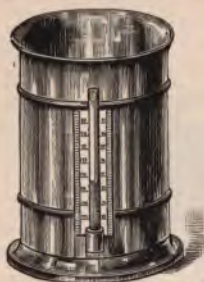
6. Government.—Whether a corporation or vestry, etc. The amount of local control (if any) possessed ; the methods of election, etc.

Lessons on Railways.—Show a map of the country chosen for the subject of the lesson, with its railway system well marked. The maps of the railway systems of one or two other countries should be put up also for the purpose of illustration, comparison, or contrast, and the systems should be carefully chosen with a view to this purpose.

1. Total mileage. Compare with other countries.
2. Number of trains, and rate of travelling. Compare district with district and country with country again. Get or give reasons for different rates.
3. Fares : workmen's, Parliamentary (explain). Express, etc.
4. Trade uses of railways. Preferential rates : their influence on trade. Light railways. Post-office work (Royal mail).
5. Pleasure uses of railways. "Trips" or excursions. Mountain railways (Switzerland).
6. Method of accommodation : closed or open compartments ; corridor trains ; Pullman cars ; buffets ; sleeping carriages. Compare English, American, and Continental.
7. The ticket system. Compare English with Continental. Electric railway system (no tickets).

Lessons on Articles of Commerce.—Take *coal* as an example.

"The apparatus being placed in an exposed situation, if at the end of a month the height of the water in the tube is two inches, it shows that the water has attained this height in the vessel, and consequently that a layer of two



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(b) Altitude.

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The Globe.**1. Its Principal Uses.**

(a) To show the shape of the earth ; its motions ; its inclination ; its zones ; meridians ; latitude ; longitude ; equator : ecliptic, etc.

(b) To teach climate, the angle of the sun, and the proximity of masses of land and water.

(c) The relative position of the various continents, countries, oceans, seas, etc.

(d) To teach tides, day and night, seasons, sunrise, and sunset.

(e) A globular magnet should be used for lessons on attraction and gravitation.

(f) A relief globe should be used for teaching mountains, valleys, etc.

2. Preparatory Lessons.—To enable a child to thoroughly understand the teaching of the globe, previous lessons should have been given on the curvature of the earth, on attraction, and on the inequalities of the earth's surface.

(a) **Simple Lessons on Attraction.**—These lessons will help the children to understand how things adhere to the earth.

(1) *Cohesion* can be taught by dipping a pencil in water.

(2) *Magnetic attraction* can be shown by a few experiments. The children will thus learn that bodies have the power of attracting or drawing each other.

(3) Extend these notions to explain *gravity*, as affecting larger bodies like the planets and stars. A globular magnet would be a great aid ; failing this use an ordinary magnet.

(b) **On the Curvature of the Earth.**—The curvature of the ocean will be illustrated by a reference to the manner of appearing and disappearing of ships. This can be illustrated by a small toy ship and a very large globe. Do not attempt other proofs at present.

(c) **Lessons on the Inequalities of the Earth's Surface** should be given. This would give the idea of mountains, hills and valleys.

The Comparative Method.

This is the method of teaching on which several of our school geographies are more or less based, and it may be used to advantage in some cases ; but the resemblances should be real, and similarity should always precede dissimilarity, **for points of likeness are more important than points of difference.** The placing of the facts side by side fixes the attention by appealing to **curiosity** and the **critical faculty**. When the comparisons take a graphic form the value of the method is enhanced. **Contrast**, a most valuable aid to memory, is the converse of **comparison**, and is very freely used. Illustrations follow, the first being taken from Meiklejohn's *Geography*, and the second from Gill's *Student's Geography*.

1. Distribution (coal fields to be marked on the map).
2. The extent of the coal industry. Compare with other countries.
3. Its uses.
 - (a) Manufactures.
 - (b) Locomotion.
 - (c) Sea travelling.
 - (d) Domestic uses.
4. Its substitutes : peat, wood, charcoal.
5. Exported to or imported from. Places to be named and pointed out.
6. Its influence on the trade and wealth of the country.
7. The factors determining its price.

Lessons on Geographical Apparatus.—One of the chief characteristics of the present teaching of geography is the development of improved apparatus for realistic teaching. Globes, maps, and diagrams of all sorts are produced in abundance and in better quality than before; but the greatest development has been in the production of instruments and models for the teaching of the physical branch of the subject; and although the present price of many of these articles keeps them out of many schools, still the young teacher ought to keep himself posted in the latest improvements of this kind. These pieces of apparatus are full of suggestions, and they may help to elucidate problems that have hitherto been unintelligible or obscure to the teacher, and they may further give him hints for the construction of cheap, simple, and self-made apparatus. Illustrated descriptions of these and of other pieces of apparatus should be collected—they are easily obtainable from the illustrated advertisements constantly appearing, and from the readily issued illustrated catalogues of the publishers—and pasted in some note book kept for the purpose. Such a book would be neither the least valuable nor the least useful in the student's library. Such pieces of apparatus would include the Geodoscope, the Tellurian, the Orrery, Cunningham's apparatus for illustrating the causes of the seasons, the Selenotrope, the Terrestrial Time Globe, the Volvorb, Clayden's model of the Atlantic, Jessop's apparatus for illustrating the effects of the earth's revolution in her orbit, and the Planisphere. The Globe is here chosen, because it is within the knowledge and experience of all.

The Globe.

1. Its Principal Uses.

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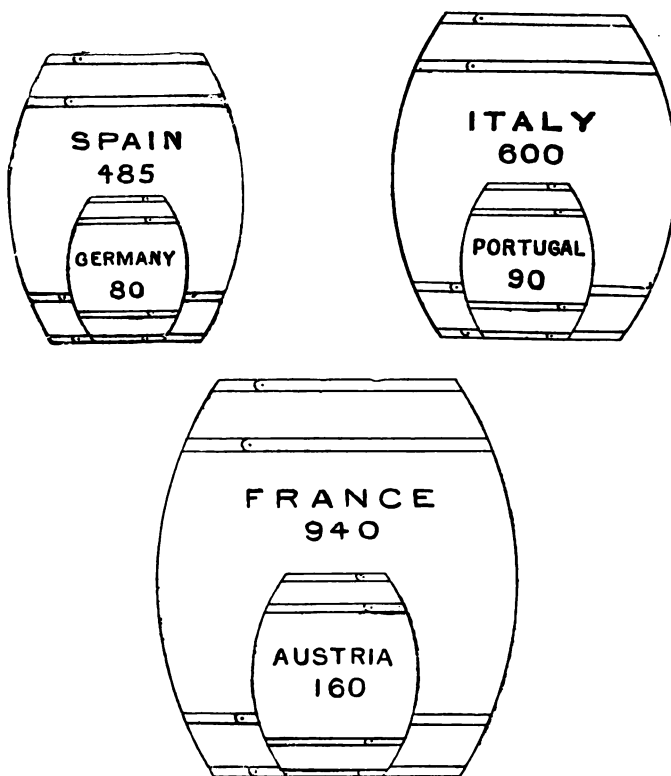
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1. Mountain Lakes.

- (a) Very deep.
- (b) Have high and steep shores.
- (c) Are generally long and narrow.
- (d) Irregular in shape.
- (e) Picturesque scenery.

Lakes in Plains.

- (a) Generally shallow.
- (b) Have low sloping shores.
- (c) Are often broad.
- (d) Regular and monotonous in shape
- (e) Tame scenery.

2. Wine productions in millions of gallons.**EXAMINATION QUESTIONS.**

- 1.—What is the meaning of the distinction between physical, political, mathematical, and industrial geography? Say which of these should be first taught, and why.
- 2.—Describe fully the relative advantages of questioning children in geography; (a) Out of sight of any map; and (b) With a map before them on which there are no names of places; and state the best way of combining these two methods of examination.
- 3.—Draw a map of the school premises, and of the roads or streets adjacent, with which you are most familiar; and say what use you would make of such a map in teaching the elements of geography.

4.—Notes of a lesson on a cape; mountains; river Mississippi; climate; winds; snow and rain (I.); changes of the season; islands; rain; formation and course of rivers; rivers.

5.—Draw a plan of the schoolroom, and show how it may be applied in the teaching of scale and proportion in map-drawing to scholars in the First Standard.

6.—Name in progressive order of teaching, the apparatus required for lessons in geography, and show how you would give a conception of scale and proportion in map-drawing to young children.

7.—State the chief points to be noticed in giving a lesson on "A River," with the order in which each point should be introduced to the class. Illustrate your answer by some English or Scotch river.

8.—Show that a map differs from a picture, and explain how you would supply the deficiencies to a class beginning to learn geography.

9.—Point out some of the means by which the attention of a class may be sustained through an oral lesson of thirty minutes' duration on geography, so that the dull or backward children may not be allowed to suffer.

10.—Name the principal uses of a globe in teaching geography, and state fully how you would employ it in giving a lesson on day and night.

11.—By what illustrations would you give children their first ideas of mountains and rivers; (a) from their own experience; and (b) on the blackboard?

12.—A complaint is frequently made that geography, as taught in schools, is confined to lists of capes, heights of mountains, etc. How far are such lists useful, and for what purpose? Illustrate from your knowledge of British capes and mountains.

13.—How would you begin teaching geography to a class of young children? Give the substance of a few of your first lessons.

14.—Draw a plan of the schoolroom with which you are most familiar, showing the position and relative sizes of desks and gallery. Explain the advantages or disadvantages of the arrangement.

15.—Describe the sort of apparatus and visible illustration which is likely to prove most helpful to a teacher in giving the earliest lessons in geography.

16.—After explaining to a class the effect of mountain ranges on climate, show how you might lead the children to seek further proofs for themselves.

17.—In giving a lesson on a river, which is the better plan—to speak first of a particular river which the children have seen, or to start with a definition and a general description? Give reasons for your opinion.

CHAPTER XIII.

HISTORY.

Value of History.

1. It helps to reveal the past history of the country, and so gives an amount of valuable *information*.
2. It calls forth feelings of *patriotism*. It stimulates the *national* pride, promotes a love of virtue, gives powerful object lessons against *vice*, and tends, rightly taught, to make *good citizens*. This ought to be its prime aim.
3. It arouses *interest* and *curiosity*, and so helps to form habits of *concentration*. This object is defeated when history lessons are crammed.
4. It furnishes plenty of work for the *reasoning* powers. The pupil learns to trace cause and effect; to generalise; and to make valuable inductions. He finds a cycle in historic events—that history repeats itself. He sees the power of the monarch grow less, and he learns why; how one class rises and another falls; and facts which throw a powerful light upon present tendencies, and give plenty of scope for thought.
5. Properly taught, and methodically studied, it may be made a good training for the *memory*, which it taxes severely.
6. Persons and events of the past are still on their trial before posterity. History presents evidence which is weighed and reasoned on; conclusions are arrived at, and *judgment* is pronounced. It thus cultivates the *critical faculty*.
7. Our *sympathies* are often called into active play, and anything which strengthens and develops sympathy is a valuable aid to social progress. It also provides a legitimate safety-valve for the play of the *malevolent affections*.
8. It increases our capacity and opportunities for *pleasure*. By association the objects in our museums, our old buildings, our

battlefields, all possess an added interest and attraction from our knowledge of history.

9. It helps to brush away national *prejudice* by giving us some knowledge of other nations. Bias against, and hatred and contempt for other nations, are often the result of ignorance.

The Objects of History.

“The history of mankind is the history of great men. To find out these, to clear the dirt from them, and to place them on their proper pedestals, is the function of the historian. He cannot have a nobler one.” (Carlyle.) This is equally true of the teacher’s function.

“The object of history is to discover and make visible illustrious characters, and pay them ungrudging honour. History teaches that right and wrong are real distinctions. That is the best condition of things which produces, not the largest amount of knowledge or wealth, but the men of noblest nature. Does history show that in proportion as men are left to their own wills they become happier, truer, braver, simpler, more reverent of good, more afraid of evil? This is a high ideal, but it is one the historian should strive to reach, for the only true progress is moral progress.” (Froude.)

What is true of the historian is again true of the teacher. The progress of morality and the development of patriotism should always be the two chief objects sought in teaching.

Bacon says it is the true object of history to represent the events themselves together with the counsels, and to leave the observations and conclusions thereupon to the liberty and faculty of every man’s judgment. A Greek writer says history is philosophy teaching by example.

“Now, what is the problem of teaching history? It is (i.) to introduce several hundreds or thousands of persons, and several hundreds of events, to an age that knows nothing, except by the power of sympathetic or anticipative imagination, of men or of things; (ii.) to make each person introduced an individual and a real character; (iii.) to show the connection of cause and effect between great events.” (Meiklejohn.)

General Hints on the Teaching of History.

1. The teacher should combine history and geography, so as to teach certain valuable lessons concerning territorial, political, and commercial history.

2. He should seek to bestow accuracy and skill in representing graphically the ideas gained from books.

3. He should teach the association of different subjects, and the knowledge that they are diverse parts of one whole.

4. He should show the connection between history and literature.

5. The pupil should receive very definite general impressions of the progress of historical events. He should also learn a considerable number of historical facts, not necessarily for immediate use, but to serve as a point of resistance for gaining other such facts in future years.

6. The pupil should make some progress in learning how to use the material he has acquired.

7. "He should develop keenness of observation in regard to the political and social conditions in which he finds himself. These conditions of themselves are seldom of interest to the pupil, for it is physical rather than mental activity that appeals to him. But our Great Charter, such rebellions as those of Tyler and Cade, our poor law, etc., should lead to a knowledge of what the State does for its dependent classes. The study of the colonists' resistance to taxation that fires the boy's heart should lead to an interest in the principles of taxation in his own day and country. Every concrete illustration of the past should find its parallel or its abstract application in the present." (Miss Salmon.)

Difficulties in the Teaching of History.

1. The subject is by no means an easy one, for *it demands plenty of good sound reasoning and reading* from the teacher. In the Baconian sense, the teacher must be essentially a "full" man.

2. *The maintenance of a proper historical perspective* is difficult. Events and persons want keeping in their proper places. The leading characters and their chief works need to be in the front of the picture plane. The unimportant, both in person and fact, should be omitted or put well back in the picture.

3. The teacher requires *good descriptive powers* to vitalise his characters and events. This will involve the possession of good vocal control, more or less dramatic ability, a readiness of illustration, and a skilful use of the forces of contrast and comparison. The imagination and the emotions also require skilful management.

4. There is a tendency to *abuse the memory* rather than to use

it. It is so easy for the teacher to give a chapter to be read up, and then to examine upon it. The memory is overworked, and very often matter thus acquired is neither digested nor retained. The memory is called into play extravagantly. If a chapter is to be read it should be read *after* a lesson on its subject matter had been given, and not before.

5. There is a further tendency to *overwork*. Too much is often demanded for the time at its disposal, and the result is disastrous. The work is neither properly taught nor digested. Even where the demands are apparently more reasonable, and a "period" only is prescribed, we have that commendable craze for "thoroughness" showing itself in the examination questions, and which must of necessity involve more work.

6. It requires, for effective teaching, *a great mental range* on the part of the pupils. History is a strange mixture of the very simple and the very difficult. Parts fall easily within the comprehension of young scholars; parts require much riper minds. Hence *the lessons must be suitable*; and the principle of selection involved is often very trying for the teacher.

Faults in the Teaching of History.

In stating the difficulties of teaching history, one naturally indicates some of its faults, for the two facts stand in the relation of cause and effect.

1. *Too much is attempted*; a mass of detail is crowded into book and lesson, only to the damage of both. This kills all interest.

2. The memory is unduly taxed; training and education disappear, and *cram* becomes rampant. This kills good method.

3. *The teaching is often unconsciously obscure*. Allusions are made, and it is often assumed they are understood. Terms are given without being defined or explained. They may be understood by the teacher: they rarely are by the class.

4. All history lessons ought to be focussed on its two main objects—moral and patriotic. This is more frequently forgotten than remembered. *The focus being wrong, the view cannot be right*.

5. *Unsuitable matter* is chosen. Often, if it is suitable in quantity, it is unsuitable in kind or quality.

6. Often there is *insufficient preparation*. Preparation is absolutely essential, even if the teacher be a full reader and a

deep thinker. The obscurity attaching to many of the lessons is one of the results accruing from this too prevalent fault.

History Books.—Professor Meiklejohn once asked in a lecture delivered by him on the teaching of history : What are the qualities we desire to find in a history book ? What would a common-sense person desire to find in a history that was to be used in schools, and that would be good for the growing mind ? He suggested three things :—

1. That the history should be interesting in itself; that it should attract and not repel its readers; that it should be read for its own intrinsic interest, and not merely for duty.

2. That the history lent itself to good reading aloud; *i.e.*, it should be written in a spirited, vigorous, and human style.

3. That it lent itself easily to reproduction; *i.e.*, that the facts and events stated and described in it were so plainly and clearly stated and described, that the young learner could easily state them over again in his own way.

STAGES IN TEACHING HISTORY.

I. Stories.—Begin with stories. Children love these, and if they are pleasantly rendered, there is soon a decided liking for them throughout the whole class. Do not seek to give too much information at first, but rather try to *interest* and *amuse*. Let there be some human nature in your lessons, and let them deal with the ways, actions, and motives of men in an elementary fashion.

1. Attractive Stories.—The stories, then, must be attractive, and every teacher of history who has had an experience of a young class in the subject knows that there are certain stories or episodes which prove particularly attractive to the scholars. Such stories include—

- (a) **Biographies.**—Under this head will fall stories of Caractacus, Boadicea, Alfred, Becket, Rosamond, Wallace, the Black Prince, the young Princes of York, Wolsey, Lady Jane Grey, Mary Queen of Scots, the Seven Bishops, Raleigh, Drake, the Pilgrim Fathers, Cromwell, Marlborough, Wellington, Nelson, the young Pretender, Robin Hood, Hereward, Prince Arthur, etc.
- (b) **Rebellions, etc.**—These will include such things as Wat Tyler's insurrection, Jack Cade's rebellion, the rebellion of the Percies, the Gunpowder Plot, the Meal Tub Plot, Monmouth's rebellion, the rebellions of the Pretenders and the Chartists.
- (c) **Battles.**—These should embrace such events as the piratical raids of the Danes, the Battle of Hastings, the Crusade, Bannockburn, Crecy, Poitiers, Agincourt, the Spanish Armada, Blenheim, Trafalgar, Waterloo, Balaclava, the Indian Mutiny, and the Zulu War.

- (d) **Miscellaneous.**—In this group could be placed such incidents as the meeting at Runnymede, the formation of the New Forest, the drowning of Prince William, the Field of the Cloth of Gold, the Great Plague of London, with its closely following Fire, the French Revolution, the First Exhibition, and so on.

2. The Reasons for their Attractiveness.—They are attractive because of their emotional character. There is a solid tinge of sensationalism or romance in many of them; and romance was ever attractive to the young. The imagination is indulged, and this indulgence introduces another element of pleasure. Pleasure is one of the most powerful of human motives. Whilst listening to these stories, there is a perfect indrinking of emotion, and our best psychological authorities consider this as essential for children as country walks, games, and treats. There is much of that which attracts in fiction and in the drama. These stories produce a certain amount of mental excitement, which is stimulating and enjoyable. The strength of this element can be easily understood when we reflect that the so-called pleasures of older people are often based on excitement. These historic actions appeal to our egoistic and social feelings, and so minister to our happiness. Admiration for courage, virtue, success; anger, contempt, scorn; pride of race, of conquest, patriotism in its strongest aspects, all these feelings are affected in turn, and contribute their share of attractiveness. The feeling of rivalry is stimulated only to be regulated and guided. The love of activity and power finds mental outlets in these stories. We fight with our heroes—on their side; we share their risks and triumphs, their love of approbation, and learn to love and respect them. We sympathise with those who suffer unjustly, and our sympathy runs warm into kindred cases in our own small circle. There is little or nothing educative in the first instance, for the pleasures of knowledge are yet too weak to avail; but the foundation of a love for the subject is being laid in an attractive manner, a foundation upon which is to be built the after structure of a sound historical training.

II. Biographies.—The teacher will then pass on to biography in a fuller and more educative manner, and this stage would be suited to Standard IV. and upwards. Further remarks upon this branch will be found under the head of the "Biographical Method" in the section on "Lessons on Reigns"; and still later under the head of "Notes of Lessons on Biographies".

III. Incidents.—This will be an expansion of the "Mis-

cellaneous" item under the head of "Stories". As in the preceding case, the subjects will be handled more fully, losing none of their attractiveness, it is hoped, but requiring more thought, and furnishing more training and education. The incidents should be striking, instructive, and interesting. They would include such subjects as travels, battles, voyages, plagues, rebellions, famous Acts of Parliament, plots, etc.

IV. Periods.—A period of history should next be taken—say the Tudor or Stuart period. But even here the teaching will be largely biographical. The period may be taught by one of the methods laid down in the "Lessons on Reigns".

V. Constitutional History.—A "period" could be taken in each of the higher standards, but in the highest standards the elementary principles of our Constitution should be explained; the constitution and functions of Parliament; the social and religious state of the nation, and so on. In every stage biography will form a part of the teaching, for the lives of eminent men are the historic pegs around which hang the events of a period.

LESSONS ON REIGNS.

I. Their Use.—Any such lessons as these should be given at a late period in the school course. If history has been well taught in a school, it will not have been through the "reigns" as a syllabus of lessons primarily. But as a means for *summarising* or for *recapitulating*, the reign can be used with some profit. It will test the pupil's memory and synthetical power to retain and pick out and group those portions of a series of lessons on the biographies, Constitution, literature, etc., of the people which belong to any particular reign. Few will be able to do this, as the test is too severe. Hence such lessons will afford an opportunity to the teacher of presenting his facts—facts which for the most part should be already known, or at least familiar—in a *new combination* to the pupil. The name of the sovereign will serve as a useful centre, around which these events might be grouped.

II. Method of Teaching.—There are many methods laid down in the various text books in use, but perhaps the first given is the best.

1. The Chronological Method.—The reign should be presented as a complete picture, the parts bearing each its due weight. The lesson then really reverts to a species of biography, in which the sovereign may or may not play a conspicuous part.

But all that has been said in favour of teaching history through biography can be repeated here, for it bears as much value.

2. The Epoch Method.—This is a better method for a range of history lessons than for a lesson on one reign. It lends clearness to the method, but it does not maintain interest like a narrative. The interest of pursuit is weaker, and the lesson suffers in comparison. The epochs for the reign of *John* would be something like the following :—

- (a) John's foreign policy. This would include the loss of Normandy and the murder of Arthur.
- (b) Church troubles.
- (c) The Great Charter, and John's attempts to evade it.

3. The Parliamentary Method.—In this case the reign is taught through the medium of its Parliaments. The lessons can be made methodical, clear, and intelligent. Only the most important work of each Parliament should be given, as it is unwise to overload the mind with detail. The method has one great recommendation—it teaches the history of the people, which is history proper. But it is wearisome, scrappy, and often dry. It is very difficult to maintain interest by it, and the objection is a serious one. Of course, a very capable teacher can turn any legitimate method to profit, for he is the master of his method, and not the slave of it. But the remarks are true for the average teacher. Again, it does not lend itself to the early reigns of history, so that its application is limited. The reign of *Charles I.* is taken as an illustration.

- (a) **First Parliament.**—Met 1625. Voted two subsidies of about £140,000 for war expenses. Sat two months only. Why?
- (b) **Second Parliament.**—Met 1626. Why called?
 - (1) They voted inadequate supplies.
 - (2) With these grants they coupled the condition that *they were to control and regulate every part of the government which displeased them.*
 - (3) *They withdrew the king's prohibition,* and let Bristol take his seat in the House of Lords.
 - (4) They voted that *common fame was sufficient ground of accusation by the Commons.*

The other Parliaments could be similarly dealt with. Obviously, one reign may require many lessons, each of which will make some demand upon a knowledge of the Constitution and functions of each branch of Parliament. For this reason alone such a method could only be used in the highest classes of the school.

4. The Classification Method.—Here we have the events of a reign classified under such well-known heads as—

- (a) Foreign policy.
 - (b) Home policy.
 - (c) Science, art, literature.
- Or the history of the reigns may be classified under such heads as—
- (a) The growth of constitutional liberty.
 - (b) The power of the Church.
 - (c) The growth of towns.
 - (d) The growth of trade, manufactures, etc.
 - (e) The growth of the navy.
 - (f) The progress of colonisation.
 - (g) The growth of education.

This method is logical, clear, intelligent, interesting, and lends itself to the memory. It disputes the palm with the first method, and by many is preferred to it.

5. The Biographical Method.—There is much to recommend this method. The events of a reign are the work of the great minds of that reign; and the lives of a few eminent men will embrace and explain the cause, conduct, and results of those events. Such men exercise a greater influence on a nation than a monarch. Any striking or suggestive anecdotes will be very useful to illustrate and to add interest to the lesson. Another great recommendation is its unity of plan, and the individual becomes a nucleus for occasional instruction on many other subjects.

6. The Comparative Method.—Two periods are taken, and one is compared with the other. A present reign is compared with a past; the reigns of two queens might be compared; the War of the Roses with the Civil Wars. The method is adapted to all branches of the subject. Two movements or classes might be compared: two individuals, two rebellions, or two great charters. The Lollards might be compared with the Puritans; Cade's rebellion with Tyler's; Walpole with Gladstone; or Pitt with Beaconsfield. The general principle of this method must be remembered—*that points of likeness are more important than points of difference*. Contrast may be considered a negative aspect of the same method. In such cases Walpole would be taken with Pitt, and so on.

NOTES OF LESSONS ON BIOGRAPHIES.

The notes should be divided into two columns, one of which will comprise all the *information* to be given, whilst the other should be labelled *education*, and should show what training, apart from mere information, the teacher proposes to get out of the lesson. Effect and cause should be pointed out, deductions and

inferences made, points of conduct observed and criticised, and a wise use made of contrast and comparison. The great thing to be aimed at in the "education" column is to select such points of character as are likely to be specially attractive to children, and if possible to fix them by suitable illustrations. The treatment must always depend upon the ability of the class. Properly treated, these lessons are very valuable both morally and intellectually.

History lessons are often colourless and abstract, but in biography the personality of the hero is ever before them. The children put forth an effort of constructive imagination, form their hero, and follow him eagerly through the chief incidents of his life. The interest of pursuit is thus called into play, and the lessons become vivified and successful.

The great danger of these lessons is overcrowding. The drawing up of the "information" column taxes the analytical power of the student, and makes serious demands upon his judgment. Experience has shown that pupil teachers often fail to distinguish the relative importance of the events with which they are dealing, and so lose the true sense of proportion in their treatment of the subject. For this reason it is advisable they should receive extra practice in dealing with lessons of this nature. A series of lessons on eminent men should be prepared. The difficulty of treatment then decreases with each life, which becomes an extra source of illustration, whilst points of conduct are better grasped by the increased opportunities of making comparisons and contrasts. The following notes on Walpole will require at least two lessons :—

LESSON ON WALPOLE.

Information.	Education.
<p>I. Early Life.</p> <p>1676. Born.</p> <p>1700. Entered Parliament for Castle Rising.</p> <p>1705. Councillor to George of Denmark.</p> <p>1708. Secretary at War.</p> <p>1710. Chief hand in Sacheverell's impeachment.</p> <p>1714. Paymaster of the Forces.</p> <p>1717. Disunion in Cabinet. He retires.</p> <p>1720. Resumes former office.</p> <p>1721. Prime Minister.</p>	<p>1. Treat this portion of the lesson briefly, but call attention to—</p> <p>1. <i>His success.</i> He attains the highest office in the State. Why? Inference. <i>Because of his ability and energy.</i></p> <p>2. <i>His failures.</i></p> <p>(a) Guilty of breach of trust.</p> <p>(b) Guilty of notorious corruption.</p> <p>3. <i>His punishment.</i> He was to be—</p> <p>(a) Committed to the Tower.</p> <p>(b) Expelled the House.</p> <p>Application. <i>High trust demands high principle; great power demands great honesty.</i></p>

LESSON ON WALPOLE—continued.

Information.	Education.
<p>II. Prime Minister.</p> <p>1. Personal Characteristics.</p> <p>(a) Neither a scholar nor a cultivated man; knew next to nothing of history.</p> <p>(b) Good-natured man; frank; of great industry. A great sportsman.</p> <p>(c) Great tact and common sense; a good business man.</p> <p>(d) No orator, but a good debater. Too fond of power; overbearing manner.</p> <p>2. His Statesmanship.</p> <p>(a) His Love of Peace.</p> <p>Unsuccessfully resisted the Spanish war.</p> <p>(1) "They are ringing their bells now; they will soon be wringing their hands."</p> <p>(2) "Madam, there are 50,000 men slain in Europe this year, and not one Englishman." 1734.</p> <p>(3) "My politics are to keep free from all engagements as long as we can."</p> <p>(b) His Bribery.</p> <p>(1) Refer to venality of Commons. M.P.'s sold their votes. Electors were bought and sold.</p> <p>(2) No publicity on the votes given in Parliament.</p> <p>(3) Newspapers not allowed to publish members' speeches.</p> <p>(4) "Every man has his price."</p> <p>(5) The charge of bribery overstated. Only one case proved.</p> <p>3. His Financial Policy.</p> <p>(a) His Excise Bill.</p> <p><i>Its object to stop smuggling.</i></p> <p>(i.) By establishing bonded warehouses.</p> <p>(ii.) By raising the revenue from inland dealers in the form of <i>excise</i>, instead of levying at the ports in the form of customs. Thrown out 1733.</p> <p>(b) His Free Trade Policy.</p> <p><i>The necessities of life and the raw materials of manufacture were to be free of all imposts, and that indirect taxation might be the means of freeing land from most of its burdens, if not from all of them.</i></p> <p>His opponents held that revenue should be drawn wholly from direct taxes on land.</p>	<p>Contrast or Compare him with other great men.</p> <p>These comparisons, etc., are naturally limited by what the teacher has done in previous lessons on biography.</p> <p>II. 1. (a) These show his <i>mental</i> qualities.</p> <p>(b) These facts reveal his <i>personal</i> qualities.</p> <p>(c) These his <i>parliamentary</i> qualities.</p> <p>Briefly show the influence of these characteristics upon him as Prime Minister.</p> <p>2. Describe his peace policy and show—</p> <p>(a) <i>Its success.</i> The country daily grew more wealthy; taxes were light; trade was flourishing. Quote his proud boast expressed in II. 2. (a) (2). Point out that he understood the truest interests of his country better than any of his contemporaries.</p> <p>(b) <i>His foresight.</i> The Spanish war ended disastrously. <i>He maintained that a nation never gained anything by war.</i> Point out that his opinion expressed in II. 2. (a) (1) became true, and justified his policy as expressed in II. 2. (a) (3).</p> <p>(c) <i>His obstinacy.</i> He took no interest in foreign policy. Show that this was one of the chief factors in his downfall.</p> <p>Compare with Mr. Gladstone.</p> <p>(b) Put these facts about his <i>bribery</i> before the class. State the circumstances which led to it.</p> <p>(1) The fierce opposition he had to face.</p> <p>(2) The ease with which it could be done.</p> <p>(3) That it was an established practice.</p> <p>(4) His too great love of power.</p> <p>(5) The lack of publicity.</p> <p>Give the true history of the famous phrase (b) (4). The Opposition were storming at him over this charge, when he retorted: "All these men have their price". "He durst do right, but he durst do wrong."</p> <p><i>An honest man.</i> In an age of bribery he was beyond bribes himself, and died a poor man, heavily in debt.</p> <p>3. (a) and (b) Show that this was impossible in his day, but that it has all been done since. Both in this and in his Free Trade policy he was in advance of his times. Another testimony to his <i>wonderful foresight and excellent business capacity.</i> Show that the justification of his policy is to be found in our day rather than in his own; and that so firmly did he establish the national credit, that the public creditors began to contend who should be last paid.</p>

DATES IN HISTORY.

Whilst warring justly against "cramming," we must not be led to disregard dates. Some knowledge of dates is absolutely

essential to an intelligent comprehension of history. They are supposed to bear the same relation to history that the multiplication table bears to arithmetic. They are also called one of the eyes of history.

But it is useless to learn dates unless the *events* associated with them are learned also. Talk of the event, explain and illustrate it, and the date will become an enclitic to the event. The dates are best learnt through the events; not the events through the dates.

Mnemonics are not recommended as a rule. Often they want interpreting and learning themselves. Sometimes the mnemonic is remembered whilst the key is lost, and, speaking generally, it is doubtful if much is gained by their use. The best mnemonics are interest and repetition. There must be plenty of repetition, and the dates repeated must be few and important; but the repetition should follow, not precede, the events. Properly used, the dates may afford good training for the exercise of *memory*.

The chronological system of Mr. David Nasmith, Q.C., is a specimen of a good mnemonic system, which is simple and ingenious. It has this to recommend it, that it is based on space relations, and so presents a picture to the eye. It is as follows:—

Each decade is divided into nine squares, arranged in three rows of three each. These squares are surmounted by a top border, which always begins the decade; *i.e.*, contains the cyphers (o's). It will then be observed that the ones and the nines are at opposite corners, as are also the sevens and the threes, and that the five is always in the middle. It is claimed for this method that after a little practice the difficulty is not to remember but to forget. The event desired to be remembered should be entered under its proper date in the square. Professor Meiklejohn has paid it the great compliment of adopting it in his history.

1880		
1881	1882	1883
1884	1885	1886
1887	1888	1889

THE BALLAD IN HISTORY.

I. Its Uses.—Its chief uses in the teaching of history may be thus briefly enumerated:—

1. It adds *interest* to the study; for it presents history in its most attractive form.

2. From the association of rhyme, rhythm, and romance it becomes *easier to remember* than history taught in the ordinary form.

3. There is generally an *intrinsic charm* in a ballad from its quaintness or simplicity, or its subject.

4. A ballad answers one of the best purposes of history, for it develops and encourages *patriotism*—a love and pride in the country, its people, and their achievements.

5. It is an easy and favourable method for cultivating *a love for poetry*.

6. It cultivates the *social affections*—pity, admiration, and sympathy all being stirred.

7. It *preserves words and forms*, of which it would not be very easy to produce examples in other branches of literature.

II. Its Description.—It will be necessary to make the children thoroughly understand what a ballad is, at least in the higher classes.

1. **What is it?**—Originally it was a short narrative poem, with something of both the lyric and the epic in it. In fact, it was a sort of minor epic reciting in verse, and was usually designed to be rehearsed in musical recitative, accompanied by the harp.

Before giving this description briefly explain the terms "lyric" and "epic". Probably "recitative" will also require explanation.

2. **Its Subjects.**—These were epic in their nature, and usually dealt with the adventures of lovers and the mysteries of fairyland.

3. **Its Home.**—It was chiefly used by the minstrels of the borders of England, Scotland, Scandinavia, and Spain. But the true home of the ballad in our country was the northern part of England and the southern part of Scotland.

Point out these places on the map, and explain the term "minstrel".

4. **Their Quality.**—The Scotch are generally superior to the English, and the Scandinavian to all. The literary and dialectic (explain) peculiarities of the Scotch were most probably copied from the Scandinavian bards, for they resemble each other both in form and language.

5. **Their Popularity.**—They were immensely popular with the people, who were the custodians and guardians of them. The Normans despised the nature of poetry, because they did not understand it, and so they were left entirely to the people, from whom they have retained their simple and popular character. Then they were recited by their beloved minstrels, dealt with subjects which were popular and fascinating, possessed certain peculiarities which were indicative of the people themselves, and were often set to dance music.

III. The Choice of Ballads.

A. For the Lower Standards.—The following principles should guide their selection:—

1. The subjects should be simple enough to *interest* the children.
2. The incidents should be such as would excite their *sympathy*.

3. The more *painful sides* of history should be omitted.

4. *Explanation* and sometimes *abridgment* will be necessary.

Guided by the above principles, the following list will most probably be found suitable :—

- | | | |
|---|-----------|-----------------------------------|
| (a) The Mother's Book | - - - - - | by C. M. Yonge. |
| (b) The Battle of Evesham | - - - - - | " F. T. Palgrave. |
| (c) Wickliffe's Bible | - - - - - | " G. White. |
| (d) The True History of Sir Richard Whittington | - - - - - | " Author of <i>John Halifax</i> . |
| (e) The Queen's Oak | - - - - - | " C. M. Yonge. |
| (f) The Spanish Armada | - - - - - | " G. E. Maunsell. |
| (g) Victoria's Promise | - - - - - | " C. J. Coleridge. |

B. For the Higher Standards.—There is not a large number to choose from, but the same principles should regulate their choice as for the lower standards. Copious notes, as a rule, will be necessary for Scottish ballads if chosen.

- | | | |
|--|-----------|----------------------|
| (a) Boadicea | - - - - - | - by W. Cooper. |
| (b) Alfred the Harper | - - - - - | " J. Sterling. |
| (c) The Curfew Song of England | - - - - - | " Mrs. Hemans. |
| (d) Robin Hood and Allan-a-dale | - - - - - | - Old ballad. |
| (e) Chevy Chase | - - - - - | - Old ballad. |
| (f) Joan of Arc | - - - - - | - by F. T. Palgrave. |
| (g) The Battle of Flodden | - - - - - | " T. Delaney. |
| (h) The Death of Essex | - - - - - | - Old ballad. |
| (i) The Landing of the Pilgrim Fathers | - - - - - | - by Mrs. Hemans. |

BATTLES.

I. Their Use in Teaching.—These incidents may be made instructive if properly handled. The teacher must guard against the undue preponderance of the emotional element. The feelings of *patriotism*, *admiration for courage and suffering*, and all the finer traits of human nature which are supposed to be evoked by battles, should be allowed their due share of attention and existence; but the *intellectual* value must not be overlooked. It is suggested that some such treatment as the following should be adopted :—

II. Instruction.—A brief *description* of the campaign should be given, leading up to the particular battle in question. This will arouse interest. They should then be told distinctly the parties engaged in this particular battle, and the names of the leaders on either side. A rough *map* should be drawn on the B.B. showing the relative positions of the contending forces. The battle should then be described in sufficient detail to *give an accurate idea of the event*, and to maintain the interest which has already been evoked. A careful use of any *pictures* on the subject could be made with advantage.

III. Education.—The teacher should then try to make due profit out of it. For this purpose he should place the *causes* and the *results* before the class.

1. Causes.—Why were the armies opposed? Give the causes. Then show the many interests always tending for war—standing armies, military and naval classes, the ambitions of sovereigns or politicians, portions of the press, international greed and jealousy, contractors, aggressive commerce, feminine admiration for soldiers, the craving of the masses for change or excitement, and other causes.

2. War.—Why war? Ask for better methods of settling disputes. Discuss briefly their degree of practicability. Show that war has been the custom for ages in such cases. Point to modern cases of *arbitration*. Elicit and regulate opinion on the value and morality of war *versus* arbitration. Why is war more general than arbitration?

(a) Because of necessity. In most cases, at present, other methods are impracticable.

(b) Custom. This has already been referred to.

(c) Literature often encourages it, from the Bible down to the local newspaper.

(d) Refer generally to the "interests" mentioned in (1).

3. Results.—Some of these, like death, sickness, poverty, loss of trade, and increase of taxation, can easily be obtained from the class, especially if previous lessons on any battles have been given. The other, *specific and historic results*, both *direct*, as embodied in *treaties*, and *indirect*, as arising out of the treaties (*e.g.*, the bitter feeling engendered between countries, as between France and Germany), should be told and impressed on the children.

OUR INSTITUTIONS.

Few teachers are free from the cramping effect of codes and set syllabuses; perhaps, still fewer from examinations. Where these things exist, the teacher who wishes to preserve his official existence will always be largely guided in his teaching by them. But where the teacher is a free agent, he may adopt the **living method** of teaching, which is the best educationally and the most interesting. He starts with a contemporaneous fact—a building, a personage, an institution—and traces this fact back to its very source. This method adheres to the sequence of teaching by starting with the known and proceeding to the unknown. It vitalises the teaching by placing concrete objects before the class as a starting point, and it brings a living interest to bear upon the work. Such lessons would deal with:—

1. Our Institutions.—These would include Parliament, our Courts of Justice, our Fire Brigade, Local Bodies (Vestry, Corporation, School Boards, Asylum Boards, Charity Commissioners, etc.), our Army, Navy, Militia, and Volunteers.

2. Our Historic Buildings.—These would include such places as the Tower of London, our Cathedrals, the Houses of Parliament, our famous Castles, Universities, Palaces, Museums, Picture Galleries, etc.

3. Historic Personages.—See under the various remarks in this chapter about Biography.

4. Our Towns.—Their Growth, Trade, Development, etc.

5. Inventions.—These would embrace such things as the Railway, Steamboat, Photography, the various Electrical Inventions, etc.

6. Education.—As carried out by the School, Church, Press, Literature, the Stage, and our social institutions.

Such lessons must necessarily be largely descriptive, so that the teacher will need to cultivate his powers of word-painting. They are primarily lessons for imparting information, but their moral and intellectual sides need not be absent. Above all, they are calculated to make the pupils take a budding interest in the facts which surround them, and to develop a spirit of inquiry, and a power of social and political observation. They are essentially the type of lesson necessary to impress upon the schoolboy what will be his rights and responsibilities when he becomes a citizen. An illustrative lesson on the Policeman and another on an Act of Parliament follow.

NOTES OF A LESSON ON THE POLICEMAN.

Information.	Education.
<p>I. What he is. A man appointed to preserve order and apprehend offenders. A member of an organised force maintaining order and enforcing the laws.</p> <p>II. His Power. He can—</p> <ol style="list-style-type: none"> 1. Suppress unlicensed theatres. 2. Suppress illegal sport, like cock fighting, prize fighting, etc. 3. Suppress gaming houses. 4. Superintend places of public resort. 5. Regulate traffic. 6. Regulate public processions. 7. He can arrest on his own authority, and without a warrant, any person whom he may see committing certain specific acts of annoyance in a public thoroughfare. <p>Terms Explained.</p> <p><i>Warrant.</i> A document or order authorising an officer to seize an offender and bring him to justice.</p> <p><i>Treason.</i> The offence of attempting to overthrow or betray the government of the State to which the offender owes allegiance. Conspiring against the lives of the royal family, certain of the royal councillors and judges; counterfeiting the royal seal, signet, or coin.</p> <p><i>Felony.</i> An offence which occasions a total loss of either lands or goods, or both, at the common law, and to which capital or other punishment may be added according to the degree of guilt.</p> <p><i>Misdemeanour.</i> A less offence than a felony or a crime.</p>	<p>I. This can be found out by <i>questioning</i>. Correct where necessary.</p> <p>The teacher will probably get some novel attributes assigned to the policeman.</p> <p>II. 1. Refer to local theatre. It must have a licence, otherwise police would close it. Tell who grants this licence.</p> <p>2. Point out the brutal nature of these sports. Show how public opinion has improved on the point since the days when these sports were under the special patronage of the upper classes.</p> <p>3. This is a recurring incident. Read a suitable account from the newspapers. Question on the policy and morality of gaming.</p> <p>4. Elicit by questioning and by references to their own experience the necessity for this. Rowdiness, drunkenness, etc., apt to break out at times.</p> <p>5. This will be within the knowledge of all children who live in busy towns.</p> <p>6. Refer to the London processions; Lord Mayor's show; Mayday processions; political processions to Trafalgar Square and Hyde Park. <i>Some forbidden; others not.</i> Why? Object, time, nature, place, have to be considered.</p> <p>7. Explain <i>warrant, treason, felony, misdemeanour</i>. If the class is a lower one simplify these meanings.</p> <p><i>A warrant necessary for an arrest for a misdemeanour.</i> Explain briefly the graver nature of the two first offences.</p> <p>Police sometimes arrest men for fighting, and sometimes not. Why? Show that the power to arrest is for the purpose of</p>

NOTES OF A LESSON ON THE POLICEMAN—*continued.*

Information.	Education.
<p>III. His Qualifications.</p> <ol style="list-style-type: none"> 1. Unblemished character. 2. Intelligence. This is tested by examination. 3. Physically sound, of standard height and chest development. 4. Well drilled and instructed in his duties. <p>He is then appointed to a <i>beat</i>.</p> <p>IV. His History.</p> <ol style="list-style-type: none"> 1. Previous to Sir Robert Peel's time characters of the worst and lowest description often served. He purified and reorganised them in 1829. 2. Early in the queen's reign a county constabulary was formed. 3. Peace and order were previously maintained by the high sheriffs of the counties, their deputies, and the constables appointed by the parishes. 4. In England, from the time of the Anglo-Saxon kings, an organisation, partly voluntary in its character, existed for the repression of crime, the arrest of criminals, and the maintenance of good order. 5. In Rome, in the time of Augustus, police became a special institution. 6. Traces of police organisation found in ancient Egypt and the Mosaic Law. 	<p>preserving the peace, and not for punishment, therefore they cannot arrest unless they catch red-handed.</p> <p>III. Show the necessity for these qualities.</p> <ol style="list-style-type: none"> 1. In London the police have millions of people, and property worth millions of money, under their care. Night duty would afford special facilities for a dishonest man. 2. They are peripatetic inquiry officers, have to advise, coax, etc., and often to give evidence in a court of law. 3. The work is fatiguing; hours long; risks from weather, street rows, burglars, etc., very great at times. <p>Explain <i>beat</i>.</p> <p>A Second Lesson had better be devoted to his History.</p> <p>IV. Since Peel's time the police have been a splendid agency for the purposes for which they were created.</p> <p>This part of the lesson will be descriptive.</p> <p>The teacher should show how each step from their first beginnings has been an improvement. The voluntary agency failed, hence the formation of a constabulary.</p> <p>Show the necessity for some protective force at all periods of our history.</p> <p>Compare them with the military and quasi-military nature of foreign policemen.</p> <p>To a higher class the derivation of the word might be given.</p> <p>It should be pointed out that many of our laws and institutions are based on those of Rome (ancient). Use as many pictorial illustrations as possible, and arouse sympathy with policemen by dwelling on the trying nature of their work.</p>

NOTES OF A LESSON ON THE PASSING OF A BILL THROUGH PARLIAMENT.

Information.	Teaching.
<p>I. Origin.</p> <p>A bill generally takes its origin among the people—</p> <ol style="list-style-type: none"> 1. To meet some popular demand. 2. To remove some injustice. 3. To get some right recognised and granted. <p>After discussion and education by the press and on the platform, it is formulated in the shape of a <i>bill</i>.</p> <p>II. First Reading.</p> <p>The bill is formally introduced to the House, and read without any discussion. It is then ordered to be printed and circulated among the members for their study and consideration.</p>	<p>I. The teacher first points out the conception and the stages of growth of public opinion on the question.</p> <ol style="list-style-type: none"> (a) By the press or platform, or both. (b) By public and private discussion first, then by platform and press. (c) Then some M.P. formulates these demands, and introduces them to the House in the form of a <i>bill</i>. (d) The bill is almost invariably "<i>backed</i>," i.e., backed up or supported by the names of certain other M.P.'s written on its back. <p>II. <i>Why not discussed the first time?</i></p> <ol style="list-style-type: none"> 1. The form of the bill is new to the great majority of the members. 2. Hence it would be unfair to discuss it before the members had prepared them-

LESSON ON THE PASSING OF A BILL THROUGH PARLIAMENT—*continued.*

Information.	Teaching.
<p>III. Second Reading.</p> <p>A date is then fixed by the Government for its second reading. The bill is keenly debated as a rule at this stage; and if it passes the second reading, virtually the bill has succeeded so far as the "House" is concerned in which it was first introduced.</p>	<p>selves to support or oppose it. The class will readily understand these two statements.</p> <p>III. Get the class to observe the following facts:—</p> <ol style="list-style-type: none"> 1. The bill is now discussed because the members have had ample time to study its provisions. 2. It is not, as a rule, further opposed.
<p>IV. Committee Stage.</p> <p>The House now resolves itself into a Committee for further discussion and probable modification of the bill; to expand or contract its scope; to alter it in some of its details. The alterations desired are effected by what are called amendments.</p> <p>An <i>amendment</i> is a motion put before the House by a member, in which motion he seeks to alter or amend some detail or principle of the bill.</p>	<p>(a) Because its discussion has generally been exhaustive.</p> <p>(b) Further opposition would be a waste of public time (obstruction); for the same arguments would be repeated, to meet with the same result.</p> <p>IV. Make the class understand that although the bill has passed its second reading, and the general principle of the bill has been accepted by a majority, yet the alteration of some of its details may be much desired, and so it may be keenly contested by a portion of the members.</p>
<p>V. Third Reading.</p> <p>Having passed through the Committee stage, the amended bill is generally read and voted a third time without any debate.</p>	<p>Explain <i>Committee</i>. Now a member may speak several times to the bill; whereas, in the other stages, the strict laws of debate are adhered to, and a member may only speak once.</p>
<p>VI. The Other House.</p> <p>The bill is then sent to the other House to go through the same stages as in the first House. The two Houses are—</p> <ol style="list-style-type: none"> (1) The House of Commons. (2) The House of Lords. <p>It may be defeated in the second House on its second reading, when it fails to become an <i>act</i> and dies as a <i>bill</i>. Or it may be further amended in Committee in the second House. It generally is.</p> <p><i>Money bills</i> cannot originate in the Lords. This is the only limitation to the free introduction of bills into either House. This practically makes the House of Commons the more powerful of the two.</p>	<p>Explain <i>amendment</i>, and give illustrations. The <i>report stage</i> is omitted for a later period.</p> <ol style="list-style-type: none"> (1) It is less important. (2) It is difficult to define. <p>V. The reason for this was pointed out in II. 2.</p> <p>VI. Supposing the bill to have originated in the House of Commons (most bills do), then it would go to the House of Lords. <i>Question out</i> the wisdom or policy of this. Explain as follows:—</p> <p>The Commons represent the people. The Lords the aristocracy.</p> <p>Both are existing parts of the country. Both have special interests to conserve. If either <i>alone</i> made laws, the interests of the one body might suffer at the expense of the other. Each House is then a check upon the selfishness or injustice of the other.</p>
<p>VII. Royal Assent.</p> <p>The bill is then sent to the sovereign for assent. This is now never refused. In days gone by it was not always so; but royal opposition proved an expensive and dangerous luxury, so that the assent of the sovereign may now be considered merely formal. Having received the royal assent, the bill now blossoms into an Act of Parliament, and becomes a law binding on all.</p>	<p>Explain to the class the <i>power of the purse</i>. The Government of a country is a business, and no business can go on without money.</p> <p>VII. Note the three elements comprised in the word Parliament: (1) Sovereign; (2) Lords; (3) Commons. Let them further note what would be the result if either element possessed the sole power.</p> <ol style="list-style-type: none"> (1) If the sovereign—then our government would be an <i>absolute monarchy</i>. (2) If the Lords—an <i>aristocracy</i>. (3) If Commons—a <i>democracy</i>. <p>Show that it is the blending of these three elements that constitutes the glory of the English <i>limited monarchy</i>.</p> <p><i>Two lessons</i> will probably be necessary to deal with this subject.</p>

EXAMINATION QUESTIONS.

- 1.—*Notes of Lesson* on the passing of an Act of Parliament; Joan of Arc; Cardinal Wolsey; some battle in English history; chief topic of the reign of one of the kings of England.
- 2.—Show the use of ballad poetry in the teaching of history, and illustrate your statement by some historical ballad.
- 3.—Write out the chief topics to be selected for a lesson on the reign of one of the kings of England.
- 4.—What plan would you follow in giving a description of some famous battle? Illustrate your answer by the battle of Flodden or Waterloo.
- 5.—Select points in the character of Lady Jane Grey, or Robert Bruce, or Nelson, that would be specially attractive to children, and write out some anecdote by which you would illustrate each point.
- 6.—Write out those dates of events in English history during the seventeenth century which you consider worthy of being committed to memory by children, and give reasons for your selection.
- 7.—Name some stories from English history that you have found to be most attractive to young children, and explain simply the causes of their attractiveness.
- 8.—It is sometimes said that one of the best ways of teaching history is by means of biography. Explain this. Name five or six persons whose biography would throw great light on the history of the eighteenth century, and give a slight sketch of one such biography.
- 9.—In giving a lesson on the Duke of Wellington, show what use you would make of comparison, and contrast with any other character in history.
- 10.—In teaching history, say what use, if any, you would make of chronological tables. Is it better to learn the date before or after the pupil knows something of an event, and becomes interested in it? Give your reasons.

CHAPTER XIV.

ENGLISH.

The Uses of Grammar.—It must be remembered that grammar is not absolutely essential, although it is very desirable; for we could, and many of us do, go on speaking and writing our own language more or less correctly without ever having received a grammar lesson. But there are certain advantages arising from its use, which may be briefly stated as follows:—

1. It helps the pupil to speak his own *language* correctly.
2. It is an aid to *composition*, so far as readiness, ease, and accuracy are concerned. The *vocabulary* is extended.
3. In learning a language it is *economical*, for it “abridges labour by generalising everything that can be generalised”.
4. It is the *logic* of the elementary school. Bain disputes this, but the opinion still remains. The higher faculties are called into play, for it makes the pupils familiar with the meaning, the structure, the grammatical and logical relations, and the right use of words.
5. Trench's *Study on Words* shows us also how very useful and interesting the history of many words may be, and what a great light they may throw upon the history of the people. In fact, many words are “sidelights” to history.

Difficulties in Teaching.—“The difficulties of grammar are the difficulties of all science—generalities couched in technical language.” The *difficulties arising out of language* itself are great, for children in elementary schools rarely hear good English outside the school. Their vocabulary is very limited, and there is little or no power of arrangement in the formation of their sentences. Nor are the *mental difficulties* any less. It requires greater mental power than most school subjects. Bain considers it harder than arithmetic, and says it is probably on a par with the beginnings of algebra and geometry. It is a *double acquisition*, for there is the union of language with thought. The mind is divided between the two, and this is a difficulty. Some of its stages require *great power of concentration*, and this is a thing of slow growth. Hence it is not advisable to begin teaching the subject too early. In the primary schools it begins with the

earliest standard, where the tender age of the children handicaps them severely in the study of such a subject. Finally there is a great deal of *drudgery* in the acquirement of derivation, classification, and the rules of syntax. A skilful teacher may gild the drudging pill, but it has to be taken, and drudgery is not a strong point with many.

ORDER OF TEACHING THE PARTS OF SPEECH

The parts of speech should be taught in the following order for the reasons given in each case :—

- | | | | |
|-------------|-----------------|-----------------|------------------|
| 1. Noun. | 2. Verb. | 3. Adjective. | 4. Adverb. |
| 5. Pronoun. | 6. Conjunction. | 7. Preposition. | 8. Interjection. |

Noun and Verb.—Every sentence is composed of two essential parts—the subject and predicate. In their simplest forms these are nouns and verbs; hence the noun (as the subject) and the verb (as the predicate) should be taught first. A few preliminary lessons might be given separately on the noun, but the verb is always better taught with the assistance of the noun.

The teacher will have little difficulty in getting the class to pick out *concrete nouns*, for the material objects which they mark surround the children on every side. The objects can be shown, their names given, and the definition of a noun thus may be obtained from the class. Perhaps it is hardly necessary to remind the teacher that the *name* of the object is the noun, and not the object itself. But more difficulty is experienced with *abstract nouns*. These are best taught in conjunction with adjectives and other parts of speech from which they are derived. But adjectives are not required till the Third Standard, whilst nouns appear in the curriculum for the First Standard. Still the teacher may avail himself of these aiding words without giving their technical names. The concrete nouns can also be utilised in *the building up of simple sentences*, which is the best and proper way of teaching this subject. Thus :—

1. Take a common concrete noun—*man*.
2. Affix qualities to this word with the assistance of the class; *e.g.* :—

<i>good</i> man	<i>dear</i> book
<i>strong</i> man	<i>large</i> book
<i>kind</i> man	<i>pretty</i> book
3. Then derive the abstract noun by questioning. The questioning is necessarily vague, but it is suggestive and sufficient.

A *good* man is one who has?—*goodness*.
 A *strong* man is one who has?—*strength*.
 A *kind* man is one who has?—*kindness*.

4. Then tell the class that these words—*goodness, strength, and kindness*—are abstract nouns, or nouns simply. A number of exercises dealt with in this way will help appreciably to remove any difficulty surrounding the recognition of abstract nouns.

The pointing out of verbs is not required until Standard II., but *the teacher is advised to do all his teaching through the sentence, and very simple analysis*, so that it will be found advisable to deal with the verb in Standard I. Specimen lessons follow later on, on the verb, the simple predicate, and the adjective, which the young teacher is advised to study and use.

The Adjective.—We only know things by their qualities; hence next to knowing the sign of the thing itself, it is necessary to know the words which express those qualities. There is no recognised distinction between things until we begin to enumerate their attributes, and adjectives are the words which specify these attributes. Adjectives of quality should be taught first, then quantity, and possessives and demonstratives last.

The Adverb.—The adverb modifies and extends the meaning of the verb, an adjective, or another adverb. As we have recognised the necessity for the early introduction of adjectives, because they mark the necessary distinctions between things, so it is now equally necessary to introduce adverbs to modify the actions expressed by the verbs, and to distinguish the infinite variety of ways in which an action done or suffered may be modified.

The Pronoun.—These words might now be introduced, as they are largely used to avoid the unpleasant repetition of the nouns. They are not a necessity, but rather a luxury, hence they give way to the more essential words taught before them. The personal pronouns should be taught first, whilst the demonstratives and possessives should be taught by comparison and contrast with the demonstrative and possessive adjectives through the medium of sentences.

The Conjunction.—It is, perhaps, best to take the conjunction next, as it enables us to consider compound and complex sentences, and so opens a wider range of sentences, which can now be joined together, and the various relations expressed between these sentences can be learned.

The Preposition.—This should come after the conjunction, because it does not lift us out of the simple sentence. It shows relations between words only, and is therefore placed after the conjunction, which performs the larger task of showing the relation between groups of words called sentences.

The Interjection.—These words are emotional luxuries—mere expletives, and can with reason, ease, and profit be relegated to the proper position of all luxuries—last.

HOW TO TEACH THE PREDICATE.

It has already been pointed out that the best way to teach grammar, whether it be the picking out of nouns or verbs, is best done through the medium of the sentence. For this purpose it will be necessary to give a lesson on the predicate early in the course. One step should be thoroughly mastered before the next division of the lesson is touched, and for this purpose plenty of exercises will be required at each step. In this way the notes might be used for three lessons, each lesson being confined to one division of the notes, whilst the two latter lessons should come later on.

Definitions and Examples.	Teaching.
<p>I. The Monosyllabic Predicate.</p> <p><i>Examples—</i></p> <ol style="list-style-type: none"> Boys <i>jump</i>. Dogs <i>bark</i>. Birds <i>fly</i>. <p>FIRST DEFINITION.</p> <p>A predicate consists of a word which tells you what the subject does.</p> <p>II. Passive Predicate.</p> <p><i>Examples—</i></p> <ol style="list-style-type: none"> He <i>was struck</i>. The floor <i>has been scrubbed</i>. The bells <i>were rung</i>. The table <i>is cleared</i>. <p>SECOND DEFINITION.</p> <p>A predicate may consist of one or more words which express the action done by the subject, or suffered by the subject.</p>	<p>I. Write these sentences on the B.B.</p> <ol style="list-style-type: none"> Of what are we talking here? <i>Boys</i>. and 3. Elicit <i>dogs</i> and <i>birds</i> in the same manner. <p>These words—<i>boys</i>, <i>dogs</i>, and <i>birds</i>—are called the <i>subjects</i> of our speech.</p> <p>Now, what do you say of each?</p> <ol style="list-style-type: none"> Boys—<i>jump</i> } Let the class note that Dogs—<i>bark</i> } all these words express Birds—<i>fly</i> } <i>actions</i>, and that you <p>say, assert, or <i>predicate</i> (explain further, if necessary) actions of each of the subjects.</p> <p>Now <i>analyse</i> the above sentences on the B.B., and let the class suggest others for further analysis. The scholars should then be able to give a first definition of predicate.</p> <p>II. 1. Let the class pick out the <i>subjects</i> in each sentence. Then the <i>predicates</i>. Help if necessary, and elicit by <i>observation</i> that—</p> <ol style="list-style-type: none"> The predicate in each sentence consists of two or more words. It is in the passive voice; <i>i.e.</i>, it suffers the action instead of doing it. A little skilful questioning based on comparison and contrast of the active and passive voices will probably be necessary for this step. <ol style="list-style-type: none"> The class should then orally <i>analyse</i> the sentences on the B.B. as before. They should then be asked to suggest other examples for analysis. They then should be again asked for a definition, and they should be able to give something like the improved form in the second definition. <p>III. Write these examples on the B.B. as before.</p>

Definitions and Examples.	Teaching.
<p>III. Verb "to be" with Adjective.</p> <p><i>Examples—</i></p> <ol style="list-style-type: none"> 1. I <i>am</i> foolish. 2. Thou <i>art</i> wise. 3. He <i>is</i> strong. 4. We <i>are</i> young. <p>FINAL DEFINITION.</p> <p>The predicate is the word (or words) in a sentence which expresses what is affirmed of the subject.</p>	<ol style="list-style-type: none"> (a) First get the class to recognise that <i>am, art, is, and are</i>, are all parts of the verb <i>to be</i>. (b) Next demonstrate by questioning the "incomplete" notion conveyed by the verb; <i>e.g., I am—what? Thou art—what?</i> The class will thus be led to see that the verb to be cannot form a predicate of itself, but requires another word, or other words, to complete it. (c) Then let the class <i>parse</i> the completing words. They are all adjectives. (d) Next elicit from <i>a, b, and c</i>, that a predicate may consist of the verb to be and an adjective. (e) The sentences should then be analysed as before on the B.B. (f) The class should suggest other examples for analysis. (g) They should then be invited to give the final definition, which should be written on their slates and learnt.

HOW TO TEACH THE ADJECTIVE.

As laid down in the Code, the adjective is not required till Standard III., but it is advisable to teach it before then if grammar is taught at all. Let it ever be remembered that **grammar should be taught through the sentence, and in conjunction with composition**, so that the presence of the adjective becomes almost a necessity. To keep children picking out nouns for a year, and then nouns and verbs for another year before introducing the adjective, is neither educational nor profitable. The *function* of the adjective can easily be deduced by a choice of suitable sentences, and provisional and improving *definitions* can be given as the lesson goes on. These definitions must always be given by the children, and not by the teacher. The functions having been discovered, the class might then be led on to *classify* the words into adjectives of quality or quantity, etc. *Composition* exercises might then follow, and in the end the class ought to be able to give a *definition* which should be final and general. This method of teaching is illustrated below, but the notes there given may be used for one or for several lessons, the latter being the more probable arrangement. The first lesson might end with the first definition, when a number of exercises might be worked orally, and afterwards on paper or slates.

Definitions and Examples.	Teaching.
<p>I. Introduction. List of Nouns:— <div style="display: flex; justify-content: space-around;"> Boy Courage London </div> <div style="display: flex; justify-content: space-around;"> Desk School Teacher, etc. </div> </p> <p>II. Function of Adjectives. Sentences:— <ol style="list-style-type: none"> 1. <i>Bright</i> boy. 2. <i>Real</i> courage. 3. <i>Foggy</i> London. 4. <i>Dual</i> desk. 5. <i>Board</i> school. 6. <i>Young</i> teacher. 7. <i>Many</i> apples. 8. <i>Six</i> chairs. 9. <i>This</i> book. 10. <i>The</i> truth. </p> <p>FIRST DEFINITION. An adjective is a word which helps us to distinguish one class of persons or things from another.</p> <p>III. Classification of Adjectives. <ol style="list-style-type: none"> 1. <i>Quality</i>. Bright, real, foggy, board, young. 2. <i>Quantity</i>. Dual, many, six. 3. <i>Demonstrative</i>. This, the. <p>Other Examples:— <ol style="list-style-type: none"> 1. <i>Quality</i>. Good, bad, nice, nasty. 2. <i>Quantity</i>. All, any, some, none. 3. <i>Demonstrative</i>. That, these, those. </p> </p> <p>IV. Composition Exercises. <ol style="list-style-type: none"> 1. The bright boy took the prize. 2. Real courage is to be praised. 3. Foggy London is a mighty city, etc. </p> <p>V. FINAL DEFINITION. An adjective is a word used with a noun to denote some distinguishing attribute of quality or quantity, or relation belonging to the object or thing for which the noun stands.</p>	<p>I. Ask for some nouns, or let the class name some of the common objects around them. Something like what is opposite will be given. Write them on the B.B.</p> <p>II. Deal with these nouns as follows:— <ol style="list-style-type: none"> 1. <i>Boy</i>. By <i>questioning</i> elicit that the term is general or common. If we wish to specialise or distinguish the boy in any way, it is necessary to say something more about him; e.g., <i>tall</i> boy, or <i>short</i> boy, or <i>bright</i> boy, etc. Lead the class to see the principle of <i>selection, grouping or classification</i> involved; e.g.:— <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">The bright boy implies others not bright</div> <div style="text-align: center;">tall " " " tall</div> <div style="text-align: center;">short " " " short.</div> </div> </p> <p>We have observed the boy and noted a special quality—not of the word "boy," but of the boy himself.</p> <p>Deal with the other examples in the same way. The distinguishing word in each case is called an <i>adjective</i>.</p> <p>The class should now give a preliminary <i>definition</i> of an adjective.</p> <p>III. Educe by further <i>questioning</i> and <i>explanation</i> (if necessary) that some of the adjectives indicate— <ol style="list-style-type: none"> 1. <i>Quality</i>. They tell the kind of boy, etc. 2. <i>Quantity</i>. These all deal with number. 3. <i>Demonstrative</i>. Give this word and explain that it means "to point out". </p> <p>Write the three classes on the B.B., and place each word in its right class.</p> <p>Ask class for other examples.</p> <p>IV. Add these examples. Let the class affix a noun in each case, and then <i>make a complete sentence of each example</i>. This will be a good composition exercise.</p> <p>V. The class should now be invited to give a final definition. This must be gradually worked into the desired form by the teacher's aid, if necessary. Further explanation and more examples may be required, but the class must give the <i>definition</i>.</p> <p><i>N.B.</i>—The attribution to the pronoun is left for a subsequent lesson.</p>

THE ADVERB.

The method laid down for the teaching of the adverb is much the same in principle as that for the teaching of the adjective. The teacher's first task will be to develop the idea of the adverb in connection with suitable sentences. It should be developed with *verbs* first, as the modifying of verbs is its primary function. For this purpose *simple sentences* should be written on the B.B., and they should then be *expanded* by the addition of adverbs. From these expanded sentences the *functions* of the words should

be deduced, and their *classification* made. A *first definition* should then be given. Its use with *adjectives* and other *adverbs* could next be taken, after which the class ought to be able to give the *final definition*. Plenty of *exercises* should accompany each stage. A lesson in illustration follows.

Definitions and Examples.	Teaching.
<p>Develop the Idea.</p> <p>1. With Verbs.</p> <p><i>A. Suitable Sentences.</i></p> <p>(a) You go. (b) He sings. (c) She paints. (d) They ride. (e) Are you sick? (f) You are well.</p> <p><i>B. Expanded Sentences.</i></p> <p>(a) You go <i>there</i>. (b) He sings <i>well</i>. (c) She paints <i>much</i>. (d) They ride <i>often</i>. (e) Are you sick? <i>No</i>. (f) Are you well? <i>Yes</i>.</p> <p><i>C. Classification.</i></p> <p>(a) There—place. (b) Well—manner. (c) Much—degree (quantity). (d) Often—time. (e) No—negation. (f) Yes—affirmation.</p> <p>FIRST DEFINITION.</p> <p>An adverb is a word added to a verb to show place, manner, degree, time, negation, or affirmation.</p> <p>2. With Adjectives and Adverbs.</p> <p><i>Sentences.</i></p> <p>(a) He is <i>very</i> good. (b) She is <i>most</i> kind. (c) <i>How</i> divinely good! (d) He did it <i>so</i> quickly. (e) He ran <i>remarkably</i> fast.</p> <p>FINAL DEFINITION.</p> <p>An adverb is a word used to modify a verb, an adjective, or another adverb.</p> <p>3. Exercises.</p> <p>Several exercises should be written here.</p>	<p>1. (a) Write these sentences on the B.B. Let class analyse them, pointing out the subject and predicate in each case.</p> <p>(b) Ask the class to add words to each of the sentences in (a). "Objects" and "adverbs" will be principally given. Select the adverbs, and at present disregard the objects. Something like the additions opposite will be given.</p> <p>(c) Obtain the fundamental meanings of each of these words by <i>suitable questions</i>.</p> <p>(i) <i>Where</i> is he to go? <i>There</i>, in that place. Hence the word denotes <i>place</i>.</p> <p>(2) <i>How</i> does he sing? <i>Well</i>. The word denotes the way or <i>manner</i> or quality of his singing.</p> <p>(3) <i>When</i> does he ride? <i>Often</i>. So get <i>time</i>, or when.</p> <p>(4) Educe negation, affirmation, and degree by similar methods.</p> <p>Other examples should be given by the teacher; then by the class. In each case the class should be asked to specify the relation expressed by the word.</p> <p>The class should then give this definition, write it on their slates, and learn it.</p> <p>2. Write these sentences on the B.B., and proceed as in 1.</p> <p>(a) Let class <i>underline</i> the adverbs in each sentence.</p> <p>(b) Class next to point out the words to which the adverbs are added or which they <i>modify</i>. (Explain this phrase.)</p> <p>(c) The modified words should then be <i>parsed</i>; but not fully. It will be noticed that some are <i>adjectives</i> and some are <i>adverbs</i>.</p> <p><i>Adjectives.</i> Good, kind, good.</p> <p><i>Adverbs.</i> Most, how divinely, so quickly, remarkably fast.</p> <p>(d) Class to give the final definition, then write it upon their slates and learn it.</p> <p>3. The exercises should be kept within the limits of the present definition. The harder and more obscure cases should be left for a subsequent lesson.</p>

PRONOUNS.

The *case of the relative pronoun* affords, perhaps, the greatest difficulty in the teaching of the pronoun. The reasons may be various, but those following are among them. The mistakes

arise over the objective case, the nominative being incorrectly used in its place. The probable causes are—

1. The prevalence of the errors surrounding the child. Even well-educated people sometimes go astray over the case of the relative, and errors in its use are found in some of our writers.

2. The distance of the relative from its verb will account for this error. The relation between the two is lost owing to the distance; e.g., “*Who* are you *calling* names?”

3. The tendency of the language to cast off inflections will probably account for the use of *who* to the exclusion of *whom*; e.g., “I don’t know *who(m)* you mean”.

How to Teach the Case of the Relative Pronoun.

I. Write on the B.B. the following or similar sentences :—

1. This is the house *that* Jack built.
2. I know a man *who* draws well.
3. I saw the dog *whose* head you patted.
4. I defended the man *whom* he slandered.

Ask the boys to point out the relative pronoun in each sentence, and underline it on the B.B. It is assumed that the class can recognise a relative pronoun. The difficulty to be cleared is one of case only.

II. Let the class orally *analyse* the sentences on the B.B., the teacher correcting where necessary.

Sentence.	Subject.	Predicate.	Object.	Extension.
1 { This is the house 2 { That Jack built.	This Jack	is the house built	that	
1 { I know a man 2 { Who draws well.	I who	know draws	a man	well
1 { I saw the dog 2 { Whose head you patted.	I you	saw patted	the dog whose head	
1 { I defended the man 2 { Whom he slandered.	I he	defended slandered	the man whom	

III. Now proceed by a few carefully graded questions to elicit the case in each sentence; thus :—

1. Elicit the *antecedent* in each sentence.
2. Use the analysis to determine *to which sentence the relative belongs*.
3. Next elicit the *function* of each relative. In each case call attention to its position—subject or object—which indicates its function. The subject is in the nominative case; the object in the objective case. This will explain all except *whose*. For this question substitute, and the case is recognised, e.g., whose head?—the dog’s head. What is the case of dog’s?—*whose* is the same case.

IV. A collection of common errors should now be submitted to the class for correction; *e.g.* :—

1. Who did you say?
2. I don't know who you want.
3. Who did he do it for?

MOODS OF VERBS.

In giving lessons on the moods of verbs, the teacher will begin by developing the idea of mood through the medium of the sentence, choosing the sentences carefully for this purpose. The verb in each sentence should be underlined, and its function named. After a number of exercises of this sort, the class might be asked to give a definition of mood.

The teacher can then proceed to the special moods, and he should begin with the indicative as the mood of commonest use. The method is the same. Through the medium of sentences the function of the indicative will be deduced, a definition will be required, and a number of examples given.

The imperative mood is taught in the same way as the indicative. It will only be necessary in addition to emphasise its two chief characteristics.

1. Its subject is generally absent.
2. It has in reality only one person—the second.

The infinitive mood is a little more difficult than either of the previous moods, but the method of teaching is still the same. Its functions and characteristics will be deduced from well-chosen sentences; the unlimited application of the action or state expressed by the verb will be enforced, and the consequent absence of a subject. As in all previous cases, the definition must be the work of the class.

The subjunctive mood is a vanishing one in English. It is probably the most difficult mood for children to grasp, hence its teaching is here set out in more detail than the other moods.

Lesson on the Subjunctive Mood.

Matter.	Method.
<p>I. Idea Developed.</p> <p>Sentences.</p> <ol style="list-style-type: none"> 1. If you <i>drink</i> this you may get better. 2. If he <i>apologise</i> I will forgive him. 	<p>I. Write these sentences on the B.B. Point out the verbs, and underline them. Class then to observe that—</p> <ol style="list-style-type: none"> 1. Expresses a <i>doubt</i>. 2. Expresses <i>possibility</i>. 3. Expresses a <i>wish</i>. 4. Expresses a <i>consequence</i>. 5. Expresses a <i>supposition</i>.

LESSON ON THE SUBJUNCTIVE MOOD—*continued*.

Matter.	Method.						
<p>3. I would I <i>were</i> a bird, that I might fly to thee!</p> <p>4. If only one man <i>be saved</i>, I shall not have worked in vain.</p> <p>5. Be careful, lest you <i>fall</i>.</p> <p>II. DEFINITION.</p> <p>The subjunctive mood is a <i>subjoined mood, used to express doubt, wish, possibility, consequence, or supposition, all as moods of the mind.</i></p> <p>III. Characteristics.</p> <p>1. It is the mood of <i>subjective assertion</i>.</p> <p>2. It is always dependent on some other clause which is antecedent in thought, and generally in expression. The antecedent clause is called the <i>conditional clause</i>; the subjoined clause is called the <i>consequent clause</i>.</p> <p>3. It is gradually dying out of use.</p> <p>IV. FINAL DEFINITION.</p> <p>The subjunctive mood is that form of the verb which is used in a sentence that is subjoined to a principal sentence, and which does not express a fact directly, but only the relation of a fact to the mind of the speaker.</p>	<p>II. These are the primary functions of the subjunctive mood, and from these the class can now give a provisional definition.</p> <p>Explain—Subjunctive, from <i>subjungere</i> = to join on to.</p> <p>III. Explain to the class that it does not express a fact directly, but only the <i>relation of a fact to the mind of the speaker</i>. Point out that it is used in a sentence which is <i>subjoined</i> to a principal sentence. The teacher can point this from the examples given.</p> <p>It should then be <i>contrasted with the indicative</i>, which deals with <i>actual facts</i> which exist independent of our minds. Such existence we call <i>objective</i>, whereas the subjunctive deals with facts which exist <i>in the mind of the speaker</i>, whether they really exist outside or not. Such existence is called <i>subjective</i>. Then put the contrast on the B.B.</p> <p>Indicative = Mood of Objective Assertion. Subjunctive " Subjective</p> <p>Illustrate further from the sentences supplied. Give, and then ask for, other similar sentences.</p> <p>The teacher should next put some sentences on the B.B. as examples of <i>condition</i> and <i>consequence</i>.</p>						
	<table> <tr> <th data-bbox="558 793 728 839">Condition.</th><th data-bbox="728 793 902 839">Consequence.</th></tr> <tr> <td data-bbox="558 839 728 914"> <p>1. If it were done when 'tis done</p> <p>2. If he be the man</p> </td><td data-bbox="728 839 902 914"> <p>1. Then 'twere well it were done quickly.</p> <p>2. Then he shall die.</p> </td></tr> <tr> <td colspan="2" data-bbox="558 914 728 1047"> <p>3. Tell the class this fact, and illustrate with a few carefully chosen sentences.</p> <p>The class should then be able to give the final definition.</p> <p>A good selection of examples should then be given for practice.</p> </td></tr> </table>	Condition.	Consequence.	<p>1. If it were done when 'tis done</p> <p>2. If he be the man</p>	<p>1. Then 'twere well it were done quickly.</p> <p>2. Then he shall die.</p>	<p>3. Tell the class this fact, and illustrate with a few carefully chosen sentences.</p> <p>The class should then be able to give the final definition.</p> <p>A good selection of examples should then be given for practice.</p>	
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TENSE.

In teaching tense the teacher will seek to deduce the term from a number of suitable sentences. He might then give the derivation. His object will be to show the class that each verb gives some notion of *time*; then to compare and contrast the forms of the verbs to show also that the form of the verb is different for different tenses. According to the general principle

laid down in this book, the definition should be the work of the class.

The teacher should then deal with the other function of tense—the indication of *completeness* or *otherwise*. This might be deduced from suitable sentences again, all of which should be in one tense, say the present, and by the time the teacher has worked out the various forms of the present tense, he will have done enough for one lesson. A further lesson should follow dealing with the other tenses in the same way as the present. A third lesson would also be required for the compound tense forms. A lesson is now given in illustration of the method to be employed.

A First Lesson on Tense.

Definitions and Examples.	Teaching.				
<p>I. Deduce Tense.</p> <ol style="list-style-type: none"> 1. I <i>go</i> to school. 2. Father <i>went</i> to school. 3. Baby <i>will go</i> to school. <ol style="list-style-type: none"> 1. John <i>loves</i>. 2. John <i>loved</i>. 3. John <i>will love</i>. <p>II. Derivation.</p> <p>From the French <i>temps</i>, which comes from the Latin <i>tempus</i>, meaning <i>time</i>.</p> <p>PROVISIONAL DEFINITION.</p> <p>Tense is that form of the verb which indicates time.</p> <p>There are three tenses or "times"—</p> <p>1. Present. 2. Past. 3. Future.</p>	<p>I. Write these sentences on the B.B., and elicit by questioning that—</p> <ol style="list-style-type: none"> 1. I go to school now—at the <i>present</i> time. 2. Father went to school in the <i>past</i>. 3. Baby will go to school at some <i>future</i> time. <p>Each verb gives some notion of time.</p> <p>Then write on the B.B. the next three sentences. Let the class examine the verbs in each. Each verb again gives us some notion of time.</p> <p>Next <i>compare</i> and <i>contrast</i> the <i>forms</i> of the verbs by writing them on the B.B. alone, and by calling attention to their terminations; e.g.—</p> <p><i>loves, loved, will love,</i></p> <p>and deduce that the form of the verb is different for different tenses.</p> <p>II. Give the derivation. The class should then be able to give the provisional <i>definition</i> opposite.</p> <p>III. 1. Write sentence 1 on the B.B. Class to note that—</p> <ol style="list-style-type: none"> (a) The action is <i>present</i>, but (b) The idea of time is <i>not definite</i>. <p>It may mean, I am working at this moment; or that I am in the habit of working, although I may not be at work at this present moment. Hence <i>the idea of time is indefinite</i>, and the word <i>work</i> marks <i>present indefinite time or tense</i>.</p> <p>2. Write 2 on B.B. It shows that the action (a) is <i>present</i>, (b) is <i>unfinished or imperfect</i>. Hence it is called the <i>present imperfect tense</i>.</p> <p>3. Write 3 on the B.B. This sentence shows that the action is <i>complete or perfect</i></p>				
<p>III. The Present Tense.</p> <table> <tr> <th data-bbox="160 1161 338 1212">Sentence.</th><th data-bbox="342 1161 497 1212">Tense.</th></tr> <tr> <td data-bbox="160 1218 338 1307"> <ol style="list-style-type: none"> 1. I work. 2. I am working. 3. I have worked. 4. I have been working. </td><td data-bbox="342 1218 497 1307"> <ol style="list-style-type: none"> Indefinite. Imperfect. Perfect. Perfect continuous. </td></tr> </table>	Sentence.	Tense.	<ol style="list-style-type: none"> 1. I work. 2. I am working. 3. I have worked. 4. I have been working. 	<ol style="list-style-type: none"> Indefinite. Imperfect. Perfect. Perfect continuous. 	
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FIRST LESSON ON TENSE—*continued.*

Definitions and Examples.	Teaching.
FURTHER DEFINITIONS.	
1. The Present Indefinite Tense indicates that the action is present, but its precise moment indefinite.	at the <i>present</i> time. <i>Have worked</i> is therefore in the <i>present perfect tense</i> .
2. The Present Imperfect Tense shows that the action is not finished.	This tense is generally difficult to children. Point out to them that though the action is finished, we only speak of it as being finished at present.
3. The Present Perfect Tense shows that at the present time the action is finished.	4. Treat this sentence in the same way. It shows that the action <i>has been going on, and is now finished</i> . This tense again is difficult. Try to make the class understand that the action—
4. The Present Perfect Continuous Tense shows that the action has been going on, and is now finished.	(a) has been going on up to the <i>present</i> ; (b) that since the work <i>has been, i.e.,</i> is now over, it is <i>complete</i> ; (c) that I have been working for some time, <i>i.e.,</i> that the action was <i>continuous</i> . The class will then see why it is known as the <i>present perfect continuous tense</i> . Have these definitions committed to memory, and give plenty of exercises for practice.

PREPOSITIONS.

There are certain well-marked principles which characterise most of the lessons given in *accidence*, and which perhaps it will be wise to emphasise once more by collecting and enumerating. Every lesson in this chapter is shaped and guided by those principles, and they should be firmly fixed in the memory. They may be described as follows:—

1. The teacher's first task is to develop the idea of the subject of the lesson through the medium of the sentence.
2. Definitions should always be the work of the class. Furthermore, they should be synthetic or provisional, being given at the different divisions of the lesson, and growing finally into the complete statement.
3. Plenty of exercises should be afforded in illustration of the truths or principles the teacher is seeking to establish.
4. The functions and characteristics of each particular subject should also be developed through the medium of the sentence.
5. After the various rules, truths, and principles have been discovered by the class from matter supplied by the teacher, they should be committed to memory—not before.

The following lesson on Prepositions is based on these principles, and it would be a good exercise for the young teacher if an attempt was made to write notes of lesson on Conjunctions in the same way.

How to Teach the Preposition.

Definitions, Exercises, etc.	Teaching.
<p>I. Develop the Idea.</p> <ol style="list-style-type: none"> 1. The book is <i>on</i> the desk. 2. The boy is <i>in</i> the school. 3. Love <i>in</i> a cottage. 4. The tree was struck <i>by</i> lightning. <p>FIRST DEFINITION. A preposition is a word which expresses some relation between two nouns.</p> <p>II. Derivation. <i>Pre</i>—before; <i>positus</i>—placed. The preposition is placed before the noun.</p> <p>Exceptions.</p> <ol style="list-style-type: none"> 1. Whom was this done by? 2. What was he after? 3. What did you do that for? <p>SECOND DEFINITION. A preposition is a word placed before a noun (or pronoun), and which expresses some relation between that noun and another.</p> <p>III. Government.</p> <ol style="list-style-type: none"> 1. The mouse is <i>in</i> the cage. 2. The cat is <i>under</i> the table. 3. He killed the man <i>with</i> a sword. <p>Prepositions govern nouns in the objective case.</p> <p>IV. Classification.</p> <ol style="list-style-type: none"> 1. Place. <ol style="list-style-type: none"> (a) <i>Rest in</i>—at, by, in, out. (b) <i>Motion</i>—to, from, into. 2. Time. <ol style="list-style-type: none"> (a) <i>Duration</i>—pending, during. (b) <i>Past</i>—since, from. (c) <i>Present</i>—at, in. (d) <i>Future</i>—till, unto. 3. Causality. <ol style="list-style-type: none"> (a) <i>Motive</i>—from, for. (b) <i>Agent or instrument</i>—by, with. <p>FINAL DEFINITION. Prepositions are words placed before nouns or pronouns to show some relation of place, time, or causality.</p>	<p>1. Show a book. Class to name it. Point to a desk. Class to name this. No connection or relation between them obvious to the class at present. Now place the book <i>on</i> the desk. Any connection or relation between them now? The word <i>on</i> expresses this relation.</p> <p>Strengthen the idea by shifting the position of the book.</p> <ol style="list-style-type: none"> 1. Place the book <i>under</i> the desk. 2. Place the book <i>far from</i> the desk. 3. Place the book <i>near</i> the desk. <p>In each case the class is to point out the relation between the book and the desk. Then they might point out the word in each case expressing the relations between the various nouns in sentences 2, 3, and 4.</p> <p>II. Give the derivation of the word.</p> <p>By reference to the examples, show that the word is placed <i>before</i> the noun or pronoun.</p> <p>Ask for any exceptions, and give them if necessary. The exceptions are not bad grammar, but bad composition. Have them given in an improved form; e.g., By whom, etc.</p> <p>III. Write these sentences on the B.B., and let the class pick out all the nouns. In the first sentence ask for the case of "mouse" and "cage". <i>Cage is objective by "in".</i> Similarly, <i>table is objective by "under"; sword is objective by "with".</i></p> <p>Then Prepositions govern in the objective case.</p> <p>IV. Write on the B.B. the following sentences:—</p> <p>Place.</p> <ol style="list-style-type: none"> 1. He sits <i>in</i> the chair; i.e., he <i>rests in</i> the chair. 2. This hangs <i>out of</i> the window; i.e., <i>rests out of</i> the window. 3. He is <i>at</i> school now; i.e., he <i>rests or remains at</i> school. <p>Motion. Write on the B.B.—</p> <ol style="list-style-type: none"> 1. He goes <i>to</i> London. Motion—<i>to</i> London. 2. He comes <i>from</i> school. Motion—<i>from</i> school. 3. They walk <i>up</i> the hill. Motion—<i>up</i> the hill, etc. <p>Time and Causality.—Deal with these in the same ways as with place and motion. The final definition should now be given, written on their slates, and committed to memory.</p> <p>Exercises should follow as usual.</p>

PARSING.**Its Difficulties, and How to Deal with Them.**

The difficulties here referred to are special ones, and their

occurrence is chiefly owing to the double and triple functions of some words. A child has been accustomed to meet a certain word or words as certain parts of speech. The word is met performing another duty; there is a breach of expectation, followed often by the consequent mental demoralisation. It is the teacher's object to prevent this, and so these difficulties must be dealt with as they appear. Take the following as examples:—

1. He cast one *look* behind. She said, " *Look* at me ".
2. How do you *form* your letter? That letter has a curious *form*.
3. He did it without *help*. Do not *help* him.
4. (a) The *cold* is severe in winter. (b) It has been a *cold* season. (c) Do not catch *cold*.

The teacher should first note what parts of speech are comprised in the difficult words—nouns, verbs, and adjectives. He should then ask for definitions of these parts of speech, and apply these definitions as follows:—Ask the class for examples; for sentences containing nouns, verbs, and adjectives. Then let the pupils point out distinctly the functions of these words in *their own supplied sentences*. Then analyse the sentences, and recapitulate the various ways in which subject, predicate, and object may be expressed. The teacher should then deal with the given difficulties on the B.B. as follows:—

Look (as a Noun).	Look (as a Verb).
<p>1. By Analysis. <i>Look</i> is the object, hence it is substantival.</p> <p>2. By Concord. <i>One</i> is an adjective. Adjectives qualify or limit what? Then <i>look</i> is a noun.</p> <p>3. By Substitution. He cast one <i>glance</i> behind. <i>Glance</i> may appeal more readily than <i>look</i>.</p>	<p>1. By Analysis. <i>Look</i> is the predicate, hence it is a verb.</p> <p>2. By Function. <i>Look</i> is imperative; it commands or entreats, and therefore is a verb. It expresses the action.</p> <p>3. By Substitution. <i>Regard me. Observe me.</i> These words may be more readily recognised as verbs than <i>look</i>.</p>

"Form" and "Help" may be dealt with in the same way as **Look**.

Cold (as a Noun).	Cold (as an Adjective).
<p>1. By Analysis. <i>Cold</i> is the subject in sentence 4 (a), and the object in sentence 4 (c). It is therefore substantival.</p> <p>2. By Substitution. The <i>frost, the weather, etc.</i>, is severe. Some of these words will be easily recognised as nouns. Then introduce "<i>cold</i>," and show that its function is the same.</p>	<p>1. By Function. <i>Cold</i> tells what sort of season in sentence 4 (b). Adjectives are words which show "what sort"; i.e., <i>cold</i> is a quality of "season," and is therefore an adjective.</p> <p>2. By Substitution. It has been a "<i>severe</i>" season. "<i>Severe</i>" is an adjective qualifying "season". <i>Cold</i> discharges the same functions as "<i>severe</i>," and is therefore an adjective.</p>

Difficulties may also arise from the form of composition in which the selected words are met. The language may be involved—the teacher should simplify it. It may be obscure—the teacher should elucidate it by a paraphrase. It may be in the form of poetry—the teacher should transpose it. It may be elliptical, as in some of Bacon's essays—the teacher should fill in the ellipsis.

The **form** of the parsing is important, and will depend upon the stage attained by the pupil. Three stages are recommended as being suited to the knowledge and different capacities of the children.

1. Simple Parsing.—Here the child is simply required to point out the parts of speech, and this should be done in two parallel columns.

Word.	Part of Speech.
He swims well.	Pronoun. Verb. Adverb.

2. Intermediate Form.—Here some knowledge of *accidence* and *syntax* might be required. Only elementary knowledge should be expected, and difficult constructions should be left till a later stage. The form should be in three parallel columns. The part of speech should always come first in the central column, and it should be underlined. Words influenced by concord or government should also be underlined.

Word.	Accidence.	Syntax.
He	<i>Pronoun, personal, 3rd person, sing. numb., masc. gen., nom. case.</i>	Agreeing with <i>swims</i> .
swims	<i>Verb, intransitive, in dicative, present, 3rd person, sing. num.</i>	Agreeing with <i>he</i> .
well.	<i>Adverb of manner.</i>	Modifying <i>swims</i> .

3. Advanced Form.—Here the parsing should be full, and should include more *syntax* and *accidence*. The origin of the word should be given, and where known the derivation might be added. The parts of verbs, conjugation, voice, the comparison of adverbs, and the more detailed functions of the parts of speech would be expected, whilst the parsing of an interjection should always show the emotion it signifies. The form should assume

the arrangement of four parallel columns, and the same order and underlining should be adopted as in the intermediate stage.

Word.	Accidence.	Syntax.	Origin.
He	<i>Pronoun</i> , personal (generally so called, but really a demonstrative, as personal pronouns are only of the first and second person), 3rd person, masculine gender, nominative case.	Agreeing in number and person with <i>swims</i> .	Anglo-Saxon.
swims	<i>Verb</i> , strong (swim, swam, swum), intrans., indic., present, 3rd sing.	Agreeing with <i>he</i> in number and person.	"
well.	<i>Adverb</i> of manner, positive degree, irregularly compared.	Modifying <i>swims</i> .	"

ANALYSIS.

In the teaching of analysis the word should be carefully graded, the *form* of the analysis, as in parsing, depending on the capacity and class of the pupils. In the Code this branch of grammar is not required until the Fourth Standard in the scheme usually adopted; but all teaching in grammar should commence with analysis, hence the study of this subject should commence in Standard I. The functions of words are best learnt from sentences, and not from the trick of picking out nouns and other parts of speech.

A Graduated Scheme of Analysis.

1. STANDARDS I. and II.—The work here should be confined to subject predicate, and object.
2. STANDARD III.—Subject, predicate, object, and extension of predicate (only the simpler and more obvious forms).
3. STANDARD IV.—To the above should be added the enlargement of the subject and object. In all the above cases the work should be confined to the simple sentence.
4. STANDARD V.—The compound sentence might be introduced, and the kind of sentence and the connecting word or link should be required.
5. STANDARDS VI. and VII.—The complex sentence should be introduced; the predicate should be divided into simple and compound, the latter being again sub-divided into the verb of incomplete predication and the complement (subjective, objective, or infinitive).

NOTES OF A LESSON ON THE COMPLEX SENTENCE.

Definitions and Examples.	Teaching.
I. Introduction. II. The Noun Clause. 1. <i>Kindness</i> is commendable. 2. <i>To be kind</i> is commendable. 3. <i>That we should be kind</i> is commendable.	I. Recapitulate briefly the simple sentence. II. 1. Class to point out subject. Teacher underlines it. It is a <i>noun</i> . 2. Treat this sentence in the same way. The subject here consists of three words. It is called a <i>phrase</i> . The teacher should then point out the

NOTES OF A LESSON ON THE COMPLEX SENTENCE—continued.

Definitions and Examples.

DEFINITION.

A noun clause is one which discharges the function of a noun.

Examples.

1. *Why he died* did not come out.
2. *How he got on* was never known.

3. *What I intend to do* is best known to myself.

4. Introduce a sentence in apposition with it; e.g. :—

(a) *It is a shame that he should be treated so badly.*

(b) *It is not known that he did as reported.*

III. The Adjective Clause.

1. He has a *good* book.
2. He has a book *of much merit*.
3. He has a book *which is highly esteemed*.

DEFINITION.

An adjective clause is one which takes the place of and does the work of an adjective in a given sentence.

Examples.

These can be given by the teacher.

1. The fly *that sips treacle* is lost in the sweets.

2. Heaven helps those *that help themselves*.

IV. The Adverbial Clause.

1. He ran *quickly*.
2. He ran *in a quick manner*.
3. He ran *as quickly as a bird flies*.

V. These Clauses are Subordinate, i.e., dependent upon other sentences, viz. :—

1. That sips treacle.
2. Which is worth a great deal.
3. That we should be kind.

VI. A Complex Sentence consists of principal and subordinate sentences.

Examples of Complex Sentences.

Principal.	Subordinate.
1. This is the house	<i>That</i> Jack built.
2. There was an old woman	<i>Who</i> lived in a shoe.
3. I know	<i>Where</i> you live.

The Link. This is the word joining the two sentences; as *that, who, where*. Hence a complex sentence at least is composed of a principal sentence + a link + a subordinate sentence.

Teaching.

similarity between the two subjects "*kindness*" and "*to be kind*".

3. Further expansion: the subject is now a sentence; i.e., a sentence is used instead of the noun *kindness*. Hence it is called a noun sentence or noun clause. The class should now be asked to *define* a noun clause.

They should then write several examples of their own upon their slates. These might be examined in sample if the class is a large one, and the corrections made on the B.B.

4. Let the class note the relation between it and the noun clause—it is one of apposition. It can be called the subject, and the noun clause can be said to be in apposition with it.

Other examples should be given by the class.

III. The expansion of *good* from an adjective to a phrase and from a phrase to a clause or sentence should be pointed out. Let it be firmly impressed upon the class that in each case the adjective, the phrase, and the sentence discharge the same function.

The class should now be prepared to give a definition of an adjective clause.

In dealing with further examples, in each case the adjective sentence should be converted into an equivalent word or phrase; e.g. :—

1. The *treacle-sipping* fly is lost in the sweets.

2. Heaven helps *self-helping* people.

Exercises should follow as before.

IV. Treat the adverbial clause in the same way as the noun and adjectival clauses.

V. Detach some of the clauses from the sentences to which they are joined. Analyse them. They contain subjects and predicates; i.e., they are complete sentences, and yet they give us no more information than—

1. Treacle sipping, or
2. Good, or
3. Kindness.

They are simply parts that help to complete or modify an assertion or statement. They *depend on* or are *subordinate* to the other sentences. Hence they are called *subordinate sentences*.

VI. Show that subordinate is a relative word, by such examples as—

- Father and child.
- Shepherd and sheep.
- Husband and wife.
- Principal and subordinate, etc.

The Link. Have the sentences read with the links omitted. The function of the link in each case is obvious. They "join" or introduce the subordinate sentence.

Sentences should now be supplied with the link missing, and the class should be invited to insert the right link.

WORD BUILDING.

Its Uses.

1. It gives the pupils a knowledge of the *roots*, *prefixes*, and *suffixes* of their own language.
2. It increases their *vocabulary* both actually and potentially.
3. As a consequence of 2, it improves the accuracy of their *reading* and the quality of their *composition*.
4. It has an *intrinsic value*. There is often the flash of recognition and the consciousness of power when a pupil recognises the elements of a new word and grasps its meaning.
5. It is a good exercise in *synthesis*, and synthesis is the chief method of education for young scholars.
6. It introduces the class to *derivation*, and the history surrounding many words. *In this way it throws a side light on history.*
7. It affords a good exercise in *verbal analysis*.

How to Teach Word Building.

Deal first with the **native elements**, commencing with the *prefixes*, and afterwards taking the *suffixes*. The *root* will be taught with both the prefixes and suffixes.

Prefixes.—1. Write words like the following on the B.B., and let the class divide them into syllables:—

Afternoon	equals	after-noon.	Gainsay	equals	gain-say.
Forbid	„	for-bid.	Inborn	„	in-born.
Foretell	„	fore-tell.	Misdeed	„	mis-deed.
Offshoot	„	off-shoot.	Midday	„	mid-day.

2. The class should next be asked to say *which is the more important part of the word* in each case. This they will tell from—

- (a) Its meaning.
- (b) Its function.
- (c) Its capability for independent work and position.

These will be given as **-noon, -bid, -tell, -shoot, -say, -born**, etc. *Tell* the class these are the **roots**. *Compare* with the roots and branches of a tree. The class should then *define* or describe a root, and give examples.

3. It should next be noted that the remaining parts of the words are—

- (a) Placed in front of the roots in each case; *i.e.*, they are **preplaced**.
 - (b) That they are joined to or **fixed** on to the roots.
- Hence they are called **prefixes**.

4. Plenty of *examples* should now be supplied, which should be dealt with both synthetically and analytically.

- (a) **Synthetically.** *Roots* can be supplied by teacher or class, and suitable prefixes can be added.
- (b) **Analytically.** *Words* can be supplied for analysis; *e.g.*, misdeed; *mis-* (prefix), *deed* (root).

5. The meanings of the words should now be *educated*, and little verbal or written exercises in **composition** embodying these words should be given.

Suffixes.—The number of suffixes is so great that to avoid confusion they must be *classified* carefully.

1. Write on the B.B. the following words: **baker, liar, sawyer, sailor.**

2. Ask class to divide them into *syllables*; e.g., *bak(e)-er, li-ar, sawy-er, sail-or.*

3. The *roots* should then be pointed out as in the previous lesson.

4. Then they are to remark concerning the remainders of the words—

(a) They are all placed **after** the root.

(b) They are all **fixed** to the root.

That is, they are syllables *fixed after* the roots.

5. Now, give the word **suffix**, and explain its derivation and meaning; *suf* (sub), and *fixere* (to fix).

6. The class should now *define* or describe a suffix, and give examples.

7. Now teach the *functions* of these suffixes; e.g. :—

Bak(e)-er; bake—the action of baking.

-er—the person who does the baking. }

Li-ar; lie—the action of lying.

-ar—the doer of the action. }

Hence the suffixes **-er, -ar, -or**, denote **the doer of an action**.

8. Deal with the remaining suffixes in a similar way, and in your teaching follow some such *classification* as the following, dealing with each division or sub-division *seriatim*.

(a) Noun suffixes.

1. Doer of an action.
2. Denoting an instrument.
3. Denoting abstract nouns.
4. Diminutives.

(b) Adjective suffixes.

(c) Verbal suffixes.

(d) Adverbial suffixes.

9. Only the more obvious and easily recognised suffixes should be taken first. The *more obscure cases* should form later lessons. Their too early introduction tends to confuse, discourage, and to unduly magnify the difficulties of the study; e.g., the following should be reserved :—

(a) **Suffixes**, such as *d* in *deed*; *m* in *barm*; *ship, skip, scape*; *th* and *t*.

(b) **Prefixes**, such as *a* in *asleep*; *y* in *yclept*.

10. Words involving some of the contractions, etc., met with in derivation should not be taken until after the Latin and Greek prefixes and suffixes have been dealt with.

Latin Elements.

11. When the ordinary native suffixes and prefixes are known, the *Latin* should be taken and treated much the same as the English. There will be one or two more steps at least.

(a) The English and Latin prefixes could be *compared* or *contrasted* where there is a **similarity of form**.

-in	{	English—meaning	(into)—inborn.
		Latin—	„ (into)—include.
			„ (not)—inactive.

(b) Or where there is a **similarity of function**.

ENGLISH—*fore* (before) as in *foretell*. LATIN—*prae* (before) as in *prevent*.
mis (wrongly) as in *misdeed*. *mis* (badly) as in *mischief*.

(c) **Hybrids**.—These could be dealt with here, but it would be better to postpone them until after the Greek element had been introduced. Write following words on the B.B. At least one of them will show the wisdom of postponement :—

Wondrous, dislike, goddess, anti-religious, bondage.

Give the derivations—

Wondrous—English, *wonder* ; Latin, *-ous* (osus), full of.

Dislike—English, *like* ; Latin, *-dis*.

In old English it was *mislike*.

Goddess—English, *god* ; Latin, *ix* (Norman French, ice).

Bondage—Icelandic, *bondi* (a tiller of the soil) ; Latin, *aticum* (French, *age*).

Anti-religious—Greek, *anti* ; Latin, *religio*.

Ask the class to give, where possible, the proper suffix for converting the word into a pure English or Latin word. This will be an interesting exercise for the children.

12. The *Greek* should next be taken, and taught on the same lines. There will now be greater opportunities for comparison and contrast ; e.g. :—

Contrast Greek *a* in *anarchy* with English *a* in *asleep*.

„ „ *syn* in *synthesis* with Latin *cum* in *circumference*.

„ „ *exo* in *exotic* with Latin *ex* in *expel*.

„ „ *endo* in *endogenous* with Latin *intro* in *introduce*.

13. Finally, *the more obscure and difficult cases* could be taken, e.g. :

(a) *Aphaeresis*—the taking of a letter from the beginning of a word.

Latin *exemplum* gives English *sample*.

„ *avunculus* „ *uncle*.

(b) *Syncope*—the cutting out of one or more letters from the middle of a word.

Latin *crudelis* gives English *cruel*.

(c) *Apocope*—the cutting off of the last letter or syllable of a word.

Latin *porcus* gives English *pork*.

„ *pillula* „ *pill*.

Word Branching.—Some very interesting and instructive lessons might be given on word branching. A stem could be given, its meaning made known, and then words asked for supposed to be derived from the given stem. The suggested words must retain something of the form and meaning of the stem. The teacher should supplement the lists given.

OLD ENGLISH STEM.	LATIN STEM.	GREEK STEM.
Byrn-an (to burn).	Curro (I run).	Astron (a star).
Brown (the burnt colour). Burnish (to polish). Brand new (burnt new). Brand (a piece of burning wood). Brandish (brand, a sword). Brandy (burnt wine). Brimstone (burning stone). Brindled (striped with brown). Bruin (shock of onset, where the battle burns).	Current (running). Currency (money in circulation). Concur, incur, occur, recur. Course (the track on which anything runs). Courser (a runner). Recourse, concourse, inter-course. Precursor (a forerunner). Courier (one who runs). Corridor (Spanish, passage, gallery).	Aster (a flower). Asterisk (a little star). Asteroid (starlike). Astrology, astron-omy. Astrologer. Astrological. Astronomer. Astronomical. Disaster (ill fortune).

The above lists, which are copied from Blackie's *English Language and Literature*, afford typical examples of the kind of exercise to be given or obtained. No branch of word building is more interesting or more popular than these thought and memory-raking exercises.

Inductive Lessons.—The class should now be ready for a series of capital *inductive lessons* on the subject, which might take some such form as follows :—

1. The class can be asked **to form one part of speech from another by the addition of prefix or suffix ; e.g. :—**

Noun.	Adjective.	Adverb.	Verb.	Abstract Noun.	Participle.
Fool.	Foolish.	Foolishly.	Befool.	Foolishness.	Fooling.
Smear.	Knowing.	Knowingly.	Know.	Knowledge.	Knowing.
Post.	Smeared.	Post-haste.	Smear.	Postage.	Smeared.
	Posting (house).	Beautifully.	Post.	Beauty.	Posting.
	Postage (stamp).		Beautify.		Beautifying.
	Beautiful.				

2. The **modifying force of the prefixes and suffixes** will furnish another good exercise. A stem should be taken, and the complete word should be built up upon it ; *e.g.*, take the words *self, god, stand, point*, etc.

un- self -ish-ness.	un- god -li-ness.
not-with- stand -ing.	ne-ver-the- less .
dis-ap- point -ing-ly.	trans-sub- stan -ti-a-tion.

3. Lessons on **synonyms, bilingualism, and doublets** might be given through the medium of word building.

RULES OF CONCORD.

The rules of syntax, like the definitions of grammar, should be *learned inductively and applied inductively ; i.e.*, they should be truths

and statements discovered by the pupils themselves from the examination of sentences. Too often the rule or definition is given by the teacher, and then explained and illustrated. We observe facts, and then make generalisations on them, simple probably in the first case, but proceeding gradually to more difficult cases. That is the inductive part. When the rule or definition is known, plenty of examples should be given for applying the rules. That is the deductive part. As an *illustrative lesson* we might take the rules of **concord of the verb** with its subject in sentences connected by disjunctive conjunctions.

Rules and Examples.	Teaching.
<p>I. Introduction. <i>Simple concords.</i> The verb agrees with its subject in number and person.</p> <p>II. Adversative Conjunctions. 1. I tried, <i>but</i> he did not. 2. He is severe, <i>yet</i> he is just. 3. I failed, <i>nevertheless</i> I was hopeful. 4. He will do it, <i>notwithstanding</i> the risk attached to it.</p> <p>III. Distributive Conjunctions. 1. Singular. (a) <i>Either</i> he is good <i>or</i> he is bad. (b) <i>Neither</i> did John succeed, <i>nor</i> did he fail. (c) Whether he is good or bad, I like him. (d) It must be done, <i>otherwise</i> the thing will fail. (e) He must be selfish, <i>else</i> he would give. (f) He will have to do it, <i>or</i> I shall want to know why.</p> <p>2. Plural and Singular. (a) <i>Either</i> he <i>or</i> they were wrong. (b) <i>Neither</i> he <i>nor</i> they were right. (c) <i>Neither</i> the king <i>nor</i> his men were there.</p> <p>3. Different Persons. (a) <i>Either</i> he <i>or</i> I am right. (b) <i>Neither</i> you <i>nor</i> he is right.</p>	<p>I. Recapitulate these. It is assumed they are known, and the present lesson is chosen as offering more difficulties.</p> <p>II. Deal with this class first, as it offers least difficulty. Explain <i>adversative</i>. The class will perceive that the concords are the same as in the simple sentences, because a compound sentence is composed, in each of these instances, of two simple sentences. Each simple sentence is taken separately, and its concords specified. <i>These adversative conjunctions will thus be seen to have no influence on the concords.</i></p> <p>III. Explain "distributive". 1. (a) Call attention to each sentence from <i>a</i> to <i>f</i> <i>seriatim</i>. It will be remarked that the subjects and predicates are <i>singular</i> in each case. (b) Give other sentences and invite the class to examine them. (c) Then invite the class to give you some sentences. (d) Explain, illustrate, amplify, and correct where necessary. Discuss each correction with the class. The rule ought to be now supplied by the pupils. 2. Call attention to these sentences. (a) There is a change of number (he and they). (b) <i>The verb agrees with the nearest—the plural they.</i> Then invite the class to <i>expand the sentence</i>; e.g.— <i>Either he (was wrong) or they were wrong. Neither he (was right) nor they were right. Neither the king (was there) nor his men were there.</i> The second rule should now be given. 3. (1) Teach these in the same way as in No. 2. (2) The complete rule for distributive conjunctions could then be given. (3) Exercises should be given to test the rules as stated. Some of these should be correctly and some incorrectly given. The</p>

Rules and Examples.	Teaching.								
<p>Rules.</p> <ol style="list-style-type: none"> 1. When the subject consists of two or more singular nouns joined by a distributive conjunction the verb must be singular. 2. When the subject consists of two nouns of different numbers the verb agrees with the nearer. 3. When the subject consists of two or more nouns of different persons, the verb agrees with the nearest subject. 	<p>necessary corrections should be made by the class.</p> <p>The three rules should then be written on the slates—either from dictation or from memory—and learned by the class.</p> <p>If the class is in the habit of using note books, the rules should then be entered there.</p> <p>The distributive conjunction should then be <i>tabulated</i> on the B.B., and copied by the pupils into their note books; e.g.—</p> <table> <tr> <td>Either</td><td>Or</td></tr> <tr> <td>Neither</td><td>Nor</td></tr> <tr> <td>Whether</td><td>Or</td></tr> <tr> <td>Otherwise</td><td>Else, Or.</td></tr> </table> <p>Rapidly <i>recapitulate</i> the whole lesson.</p>	Either	Or	Neither	Nor	Whether	Or	Otherwise	Else, Or.
Either	Or								
Neither	Nor								
Whether	Or								
Otherwise	Else, Or.								

PUNCTUATION.

Proper punctuation is a difficulty by no means confined to young pupils. Many ordinarily educated adults are quite unable to grapple with it. Their letters are evidence of it. The reasons are not far to seek. The subject is inherently difficult, demanding a good and ready analytic power, and the subject is rarely or ever taught.

I Its Object.—Its object is to make the writer's meaning clear; to take the place of accent, emphasis, cadence, in the spoken tongue. Children soon understand this. Let the teacher speak—within his lung capacity—a long sentence, or series of sentences, without a stop. Repeat the sentence, making proper pauses. Its object will then be obvious.

II What it is.—Certain signs, called points, notes, or marks, are used in sentences to mark off their different parts, and to show the relation of each part to the whole. The placing of these points in their right place is called punctuation.

III Method of Teaching.—Introduce the signs gradually, and in the following order, which indicates the measure of their difficulty:—

1. Full stop or period.
2. Mark of interrogation.
3. Mark of exclamation.
4. The semicolon.
5. The comma.
6. The colon.
7. Other marks.

IV. The Full Stop or Period (.)

1. Repeat a number of small, disconnected phrases, such as *birds fly, dog bark, cats steal*, pausing after each. Call attention to the cadence of

the voice at the end of each phrase. Tell them that fall of the voice is translated or represented by a full stop. Make the sign (.) upon the B.B., and call attention to it.

2. Write some short phrases on the B.B. *without stops*—the previous phrases will do. Let class read them as written, thus:—

dogs barks cats steal birds fly.

The initial capitals will be omitted, and small letters used. Now insert the stops, and let the class read them again, thus:—

dogs bark. birds fly. cats steal.

Then change the initial letters of each sentence for capitals. Let the class tell you why; if unable to do so, tell them.

Call attention to the difference in their voices. The effect is best produced by placing them in parallel lines, and having them read consecutively.

3. Now dictate a number of small sentences, gradually increasing the number of words, but in no case requiring any stop but a period.
4. Then let the class supply exercises, which could be written on the B.B., and corrected where necessary.

V. Other Stops.—The teaching of the note of interrogation and the mark of exclamation presents no difficulty. The colon is little used. All other marks can be explained as met, except the semicolon and the comma. These want special teaching.

VI. The Semicolon (;).

There is a great deal of looseness associated with the use of this mark even by educated people. Often it is entirely omitted, so that we may have an essay, a letter, or a piece of composition without the appearance of a single semicolon. When it does appear, it is often merely as a change for the too frequent commas or periods, and hence its use is often wrong. It is not easy to make young children understand its correct use, because it involves, as has already been pointed out, a certain amount of analytic power, and a readiness in detecting the opportunities for the exercise of this power.

1. Let the pupils *transcribe* good composition, and *read* well-written books, and *use* will gradually smooth the way.

This process of *imitation* is a good aid, but as a sole process it is too slow in its results.

2. Make the class thoroughly understand what a *sentence* is. Then explain *co-ordinate sentences*. Explain them to mean sentences of the same kind or sort.
3. Write on the B.B. some *unpunctuated co-ordinate sentences*. Have them read. Then punctuate them and have them read again. Then have them read consecutively. As before, introduce the capitals in their right places, and contrast the difference in voice and effect.
4. Now write a number of unpunctuated co-ordinate sentences upon the B.B. again, and let the class punctuate. Call attention to the fact that *the sentences are usually long ones*.
5. Give plenty of exercises.

VII. The Comma (,).

This should be reserved for a late lesson, because of its many uses and difficulties. It is the weakest of all our stops in prac-

tice, but its proper use, generally a matter of slow growth, may be considerably accelerated by a few preliminary explanatory lessons.

Uses and Examples.	Teaching.				
<p>I. Preparatory Work.</p> <ol style="list-style-type: none"> 1. Reading. 2. Transcription. 3. Speaking. <p>(a) With monotone.</p> <p>(b) With cadence.</p> <p><i>Examples.</i></p> <p>(a) He is a rich strong tall man.</p> <p>(b) He is a rich, strong, tall man.</p> <p>II. First Use.</p> <p>To separate short co-ordinate sentences.</p> <p><i>Examples.</i></p> <ol style="list-style-type: none"> 1. He did not come, but he will come. 2. The man is good, and he is strong. <p>III. Second Use.</p> <p>To separate nouns in an enumeration.</p> <p><i>Examples.</i></p> <ol style="list-style-type: none"> 1. Men, women, children, old and young, all were there. 2. Smith, Brown, Jones, and Robinson have all gained prizes. 3. Infantry, cavalry, transport engineers and artillery all looked tired and dirty. <p>IV. Third Use.</p> <p>To separate a series of adjectives and adverbs qualifying the same words.</p> <p><i>Examples.</i></p> <ol style="list-style-type: none"> 1. He was shrewd cautious 	<p>I. 1 and 2. These recur daily in school work.</p> <p>3. Direct the attention of the pupils to the pauses in your own speech.</p> <p>(a) The sentences selected can be repeated in a monotone and without punctuation.</p> <p>(b) In punctuated cadence.</p> <p>The class should be called upon to note the difference, and the way it is translated.</p> <ol style="list-style-type: none"> (1) Orally—by the voice. (2) Written—by punctuation. <p>Other similar sentences might be similarly treated.</p> <p>II. This use is discovered by the use of suitable examples. Let these examples be written on the B.B.</p> <p>(a) The class should first <i>analyse</i> the sentences, paying particular attention to the <i>kind</i> of sentence—<i>co-ordinate</i>.</p> <p>(b) Next let them notice that the sentences are <i>short</i>. Contrast with the semicolon.</p> <table border="1" data-bbox="534 742 875 878"> <thead> <tr> <th data-bbox="534 742 703 795">Semicolon.</th><th data-bbox="707 742 875 795">Comma.</th></tr> </thead> <tbody> <tr> <td data-bbox="534 795 703 878">Separates, as a rule, long co-ordinate sentences.</td><td data-bbox="707 795 875 878">Separates, as a rule, short co-ordinate sentences.</td></tr> </tbody> </table> <p>(c) The first use should now be given by the class, and plenty of <i>exercises</i> should be worked upon it.</p> <p>III. This use should be taught as in I.</p> <ol style="list-style-type: none"> 1. (a) Dictate this sentence without punctuation. (b) Write it on the B.B. and punctuate it. Then let pupils read it. <p><i>Some will pause at each noun, some not.</i></p> <p>Call attention to this fact.</p> <p>(c) The teacher should then read it with cadence and pauses.</p> <p>(d) The class should translate these pauses on their slates.</p> <p>(e) The teacher should then do the same thing on the B.B., and ask the class to compare and correct. <i>They are translated by commas.</i></p> <p>2 and 3. These sentences should be similarly treated, and the class should then be able to give the second use.</p> <p>IV. Taught as before.</p> <ol style="list-style-type: none"> 1. (a) Dictate sentence 1 unpunctuated. (b) Then write the sentence on the B.B.. (c) Class to note that the words are— <ol style="list-style-type: none"> (1) Adjectives in 1 and 2. (2) Adverbs in 3. 	Semicolon.	Comma.	Separates, as a rule, long co-ordinate sentences.	Separates, as a rule, short co-ordinate sentences.
Semicolon.	Comma.				
Separates, as a rule, long co-ordinate sentences.	Separates, as a rule, short co-ordinate sentences.				

Uses and Examples.	Teaching.
<p>cunning and unselfish (<i>unpunctuated</i>).</p> <p>2. He was shrewd, cautious, cunning, and unselfish (<i>punctuated</i>).</p> <p>3. He did it quickly, smartly, quietly, and cleanly.</p> <p>V. Fourth Use. It indicates the omission of a word or words.</p> <p><i>Examples.</i></p> <p>1. <i>Unpunctuated.</i> Histories make men wise poets witty the mathematics subtle natural philosophy deep moral grave logic and rhetoric able to contend.</p> <p>2. <i>Punctuated.</i> Histories make men wise; poets, witty; the mathematics, subtle; natural philosophy, deep; moral, grave; logic and rhetoric, able to contend.</p> <p>VI. Exercises. These should be "mixed".</p>	<p>(d) Let the class read the sentences as in I.</p> <p>(e) The teacher should then read with pauses, and proceed as in the last step. The class should now be able to give the third use; and they might be asked to supply other sentences to test the extent and accuracy of their knowledge.</p> <p>V. Proceed as before.</p> <p>1. (a) Dictate this sentence <i>unpunctuated</i>, and then <i>recapitulate the uses of the semicolon</i>.</p> <p>(b) Ask the class to point out the coordinate sentences. This will be best done by expanding the sentences into their full form; e.g.— The poets make men witty; The mathematics make men subtle; Natural philosophy makes men deep.</p> <p>(c) Now insert the semicolons.</p> <p>(d) The teacher will then <i>pattern read</i> the piece, making the proper pauses, and asking the class to translate them into "stops" on their slates.</p> <p>(e) Now point out that since they had to expand the sentences, there are parts omitted; i.e., <i>the sentences are elliptical</i>. The class should now be able to give the fourth use.</p> <p>Recapitulation will be very necessary in this lesson. Plenty of <i>mixed exercises</i> should be given so that the class may recognise the use in each case.</p>

THE TEACHING OF ENGLISH LITERATURE.

I Its Difficulties.—It is, like history, a mixture of the easy and the difficult; the intelligent and the abstruse; the interesting and the dull. It demands a pure taste, and careful, thoughtful reading and reflection. This combination is not an easy one to produce in pupils during the short period of their school life.

II The Teacher's Aim.—The primary aim should be *to give the scholars a love for good reading*; an active love, that will manifest itself when school days are over. To do this successfully, the teacher will require to have read much, so as to bring the beauties of our national literature within his grasp and appreciation.

III. How to Secure this Aim.

1. The Selection of the Authors.

- (a) Generally *late authors* should be preferred to old ones. The thoughts and language are better within the grasp of the pupil, and his interest will be greater.
- (b) Poetry should not be introduced too early. *Prose* is the spoken language, and the best prose is the best beginning.
- (c) Later on the pupil should be introduced to the *poets*, among whom Shakespeare should be the chief source of study.

2. Selected Portions of Authors.—The most interesting portions of these authors should be selected, and well studied.

- (a) They should know something of the *author's life*. This brings interest and light.
- (b) *A little contemporaneous history* should be introduced to throw side lights on his life. The class will then the better understand the social, religious, and political influences under which he wrote.
- (c) The *beauties and peculiarities of his style* should be pointed out. It should be *contrasted* with the language of the present day, and explained. The whole, if possible, should be written in *prose order*, piece by piece. The more difficult *words and phrases* should be unfolded. Some of the *derivations* should be learned, and the geographical and historical *allusions* placed intelligently before the class. And to do this well a portion of the author should be committed to *memory*.

THE TEACHING OF COMPOSITION.

Grammar and composition go well together, for they are necessarily complementary. If grammar is the science of language, then composition is the art.

I Its Requirements.—Composition is not easy for children, but it is very educative. Its demands are great, and are never fully met by many, either during their school life or afterwards.

- 1. It includes both *oral* and *written* language.
- 2. It involves a good knowledge of *grammar*, and a written and oral atmosphere of correct language. The latter is sometimes enough.
- 3. It demands a large *vocabulary*. Much reading gives this.
- 4. The laws of *punctuation*, of the *sentence*, and of the *paragraph* must be known.
- 5. Good composition shows *style*. This will include—
 - (a) A knowledge of *idioms*.
 - (b) The proper use of *figures of speech*.
 - (c) Certain *mental qualities*, like clearness, strength, etc.
 - (d) *Emotional qualities*, like pathos, humour, etc.

II Its Teaching.—The composition itself may be oral or written.

A. Oral Composition.

1. Subject Matter.—The teacher supplies it or gets it from the children, and this kind of composition may begin in the earliest classes. It affords plenty of scope for reference to, and for the teaching of, the rules of grammar. The common objects surrounding the children will be useful for the first lessons.

2. Teaching.—The teacher takes a common object (a book) and the class is invited to describe it orally. Its qualities are enumerated, and then collected up into one answer, and given by scholars selected by the teacher.

B. Written Composition.

1. **Subject Matter.**—In every case the matter should be supplied by the teacher, whilst early efforts should be mere exercises in the forms of language. The matter may be supplied in any of the following forms, but the sequence here suggested should be observed, as the order is believed to be progressive.

- (a) Objective descriptions.
- (b) Sentence making.
- (c) Transcription.
- (d) Dictation.
- (e) Memory composition.
- (f) Reading a short story.
- (g) Transposition.
- (h) Paraphrasing.
- (i) Original composition.

2. Teaching.

- (a) **Objective Descriptions.** Utilise the work done in oral composition. In fact, the writing down of the collected oral answers is a necessary complement to that work.
- (b) **Sentence Making.** A word can be given to the class, and they can be asked to write down sentences embracing the word; or a subject or predicate can be given, and the rest of the sentence left to their own efforts. Then these sentences might be expanded, and so synthetically a complex or compound sentence may be built up. This is a very effective method of teaching both grammar and composition.
- (c), (d) **Transcription and Dictation.** Both of these are aids, especially if any of the beauties or strong points of the passage are pointed out. But at all times the copying of good models is advisable, for imitation and memory are both strong in children.
- (e) **Memory Composition.** Choice passages are learnt and written from memory. It is a better method than (c) or (d), but is too exhausting and too expensive in time for wide practice. Nevertheless, it stores a little valuable leaven which operates according to the mental stuff it has to mix with.
- (f) **Reading a Short Story.** The story is slowly and distinctly read once or more times, the number of times depending on the class. This method trains the attention, the memory, and the power to write; for the supplying of this class of matter arouses interest, and cultivates the power of continuous composition.
- (g) **Transposing.** Here a piece of poetry is stripped of its poetic garb. Hence the passages chosen should be carefully graduated. *Transposing on a definite plan is a far better exercise than pure transposition*, but the teacher must be satisfied at first if he gets the class to transpose at all. Later on plenty of variety can be introduced by the choice of suitable passages, from which the class might do all or any of the following exercises:—
 - (1) Pure transposition.
 - (2) The expansion of all elliptical sentences.
 - (3) Conversely, the removal of all tautologies or redundances.
 - (4) Figures of speech might be explained by others more simple, or by simple English.
 - (5) Classical words might be exchanged for English words or phrases, and conversely.
- (h) **Paraphrasing.** The teacher should first give the class a good definition of paraphrasing, and illustrate it well, so that the work to be done may be clear to them. The work should be graded, so that the pupils should begin by paraphrasing—
 - (1) *Single words.* Synonyms or explanations could be given.
 - (2) *Short phrases.* A good equivalent should be expected.
 - (3) *Sentences.* These should not be too long at first.

- (4) *Transposed pieces.* Some of the transposed pieces might now be paraphrased, and the two compared.
- (5) *New pieces.* Unseens might now be given. In their first efforts at this stage the piece might be briefly explained by the teacher. Subsequently the scholars should be left to their own resources.

To get *good paraphrasing* the teacher should introduce a scheme similar to that introduced in the teaching of transposition, and should follow the sequence of teaching given above. But the chief aid will be the cultivation of the general intelligence of the class. It is a valuable study, and possesses certain advantages which far outweigh its defects.

1. Advantages.

- (1) It demands careful reading.
- (2) It develops the power of expression by training the pupil to the best uses of the language.
- (3) It improves the tastes and broadens the views.
- (4) It is as good a test of intelligence as can be given.

2. Defects.

- (1) The pupil is said to spoil the passage.
- (2) It is difficult and discouraging.
These are alleged as objections to it. The first is rubbish—the passages still exist unspoilt. Teaching will cure the second in most cases.
- (3) It breeds verbosity. The author is probably too terse for the pupil. A flood of words is the result.
- (4) Irrelevant matter is introduced, and essential matter is omitted. This is a defect, but also an opportunity for the teacher.

C. Original Composition.—As this makes severe mental demands upon the pupils, it should not be given before the Upper Standards are reached.

1. Subject Matter.—Here the pupil finds his own, and as a result, those who read most and observe most should be most successful. But the subject matter must be within the range of child life and child reading, and it should be drawn from one of two sources.

- (a) **Observation.** Early lessons might be descriptions of the common objects around them; of the animal kingdom; of common events in their lives.
- (b) **Reading.** Later lessons should make a demand upon their reading and knowledge of books.

2. Teaching.—The teacher should assist at first. He should run through the subject matter, pick out its chief heads, put them upon the B.B., and then tell the class to write a paragraph upon each. He should also encourage letter writing, seeing that they are begun and finished correctly both as to style and taste.

III. The Correction of Composition.

1. Chief Points.

- (a) The address or heading, and conclusion (if a letter).
- (b) Spelling errors.
- (c) Errors of style. Avoid exaggerations, conceits, and verbosity. This will involve a careful choice of language.

- (d) The logical arrangement of the subject matter. The chief heads or divisions must follow in proper sequence, and each should be relegated to a separate paragraph. The sentences should be kept short.
- (e) The punctuation should be correct, and too many commas should be avoided.
- (f) The handwriting should be legible and neat.
- (g) The subject matter should be suitable.

Style and language will be very largely the reflex of the pupil's own personality. The style should be simple, free from vulgarisms and figurative language. The phrases should be expressive, but not florid; whilst any appearance of "gush" should be promptly checked.

2. How to Correct.

- (a) *Spelling Errors* should be underlined, or lined through, written correctly, learned, and repeated to the teacher.
- (b) *Grammatical Errors* should be explained on the B.B. As a further aid the correct form of speech should be written by each child, and then repeated to the teacher. This brings more associative links into play, and supplies the necessary repetition for retention.
- (c) *Errors of Style* should be treated in the same way as the grammatical errors.
- (d) *Choice of Language.* The language should be improved and refined where necessary. The objectionable and the desirable form of speech should be placed in parallel columns on the B.B., and copied into the note books for future guidance and reference. This will apply equally to exaggerations, conceits, vulgarisms, slang, etc.
- (e) *Punctuation.* See section on "Punctuation".

3. When to Correct.

- (a) Whilst the class is working arithmetic examples,
- (b) Or working a test paper,
- (c) Or doing memory work,
- (d) Or doing transcription or another piece of composition—but *not* during a reading lesson, as is often the case. In all these cases a junior could superintend the class, and so set the teacher at liberty.
- (e) Two or more classes could be massed, so as to set one or more teachers at liberty.

EXAMINATION QUESTIONS.

- 1.—Notes of a lesson to a Sixth Standard on *Latin prefixes*.
- 2.—Notes of lesson on a complex sentence; moods of verbs; prepositions; the verb; first lesson on the adverb; simple analysis; adverbial phrases; the adjective and its uses.
- 3.—What are the chief points to be attended to in correcting the composition of a letter of an older class?
- 4.—Point out some of the common mistakes of children as regards the use of relative pronouns, conjunctions, and punctuation.
- 5.—What general rules of composition would you give to a class which was required to write out from memory the substance of a short story?
6. The same word may be either a noun, verb, or adjective in different sentences. Show from the following sentences how you would obviate this difficulty for children acquainted with those parts of speech only:—
He cast one *look* behind. She said, "*Look* at me". How do you *form* your letters? That letter has a curious *form*. He did it without *help*. Do not *help* him. The *cold* is severe in winter. It has been a *cold* season. Do not catch *cold*.
- 7.—Make a table showing all the principal parts of a simple sentence, and give a short sketch of your method of teaching the term "predicate".
- 8.—Give briefly, with examples, the rules of concord of the verb with its subject, when they are connected by disjunctive conjunctions in the order in which they would naturally arise.
- 9.—Show that grammar and composition may be taught simultaneously from the first. Give examples of such simple sentences as may be formed by Third Standard children to illustrate the position of the verb and adjective in a simple sentence.

- 10.—What order should be followed in teaching the parts of speech? Give your reasons.
- 11.—Discuss the influence which the careful preparation of the repetition must have upon the upper classes of a school.
- 12.—Name four or five poems or poetical extracts which you think suitable to be learned by heart by scholars of the Third and of the Sixth Standards respectively, and give your reasons for choosing them.
- 13.—Give some examples of what is called "word building" as an exercise in English, and say what is the use of it.
- 14.—After a class has reproduced in writing a short story which you have previously read to them, what is your method of revising the exercises?
- 15.—Describe the best exercises you know in English composition, and the best way of correcting them.

CHAPTER XV.

ELEMENTARY SCIENCE.

FROM the "Code" and the Revised Instructions issued to Her Majesty's Inspectors, we are able to get a few hints as to the teaching of this subject. We learn that conversational object lessons are to be given in the lower Standards, and that more systematic instruction, with the aid of text books, is to be given in the higher Standards. In all cases the work is to be done mainly by experiment, observation, and illustration, and *not* by definition and verbal description. The scheme selected by the teacher must be well graduated, and suitable to the ages of the children. It should make the scholars acquainted not only with words, but with the facts and materials of the outer world. It should also be well illustrated by models, diagrams, and experiments. Furthermore, any scheme, to meet with the approval of H.M.I., will have to show regard for the teacher's experience and qualifications, and the possible visits of a skilled demonstrator, who may be a visiting teacher to several schools.

Advantages of Studying Elementary Science.

1. Health.—The child gets some practical knowledge embodying a few essential principles for the maintenance of health; *e.g.*, physiology and domestic economy.

2. Trade.—It gives some knowledge of the objects of trade and manufacture; of articles of import and export.

3. Utility.—Many common objects are explained, brought within the comprehension of the child, and their uses are demonstrated in a practical manner.

4. Parents.—The children will develop into better parents for such knowledge. The follies and carelessness of some parents would disappear under the light of a little scientific training and knowledge. Parents are often ignorant of the laws of life. Their children are made to run all sorts of risks, so that they may look pretty. Their food is often monotonous, and badly cooked.

5. Citizens.—The exact training and discipline of such lessons will form habits of close observation, of thought, of application, which will operate on the boy, mould his habits perhaps, and influence the citizen man.

6. Pleasure.—It widens out their knowledge and their sympathies, and so *increases* their total pleasure in life

7. Interest.—The lessons are very interesting, and consequently they place the minds of the children in their best receptive conditions.

8. Rest.—Such lessons are a good change from book-work, and they afford a pleasant rest ; a rest that is not wasteful, which is the best form of rest.

9. Mind.—It gives a perfect embodiment of truth, and it teaches the right way to arrive at truth. The mind training is great if the subject is properly taught. Observation, reasoning, and memory are all strengthened and developed, whilst the constructive elements of some of the lessons appeal to the inventive powers.

Herbert Spencer writes : “ What knowledge is of most worth ? The uniform reply is—Science. This is the verdict on all the counts. For direct self-preservation, or the maintenance of life and health, the all-important knowledge is—Science. For that indirect self-preservation which we call gaining a livelihood, the knowledge of greatest value is—Science. For the due discharge of parental functions the proper guidance is to be found only in—Science. For that interpretation of national life, past and present, without which the citizen cannot rightly regulate his conduct, the indispensable key is—Science. Alike for the most perfect production and highest enjoyment of art in all its forms, the needful preparation is still—Science. And for purposes of discipline—intellectual, moral, religious—the most efficient study is, once more—Science.”

Practical Teaching.—It is a recognised principle that experimental sciences should be taught practically, *i.e.*, the pupils should not only see the objects, but handle them ; they should not only see experiments, but, where possible, perform them. Some subjects, like zoology and chemistry, cannot be properly studied without personal practical work. But whether it is expedient for pupils to work practically in all subjects of science is an open question, according to Bain, who gives the following arguments for and against. The establishment of technical schools and organised science schools, with their chemical and physical laboratories, has placed the matter almost beyond argument. All teachers are decided, probably, that when facilities exist, there practical work should always be given.

For—

1. The *impressions* made on the mind by the actual objects, as seen and handled and operated upon, are far beyond the efficiency of words or description.
2. Although diagrams have a special value in bringing out links of connection that are disguised in the actual objects, they can never *show the things as they appear to our senses* ; and this full and precise conception of actuality is the most desirable form of knowledge.

3. It enables the student to exercise a free and independent judgment upon the dicta of the teacher.
4. It is a good introduction to various scientific avocations—engineers, electricians, analysts, etc.

Against—

1. It depends on what further use is likely to be made of it.
2. A good knowledge may be obtained from a course that shows all needful experiments, without the actual participation by the pupils themselves.
3. Fine manipulations and delicate precautions are sometimes necessary. These are not likely to be observed or possessed by the pupils.
4. Mere manual manipulation cannot be called a part of scientific information or discipline, while to acquire it needs time and attention.
5. If training in the higher intellectual operations of the mind is the first object in view, it involves too great an expenditure of time.

Methods of Teaching in Elementary Science.

I. Observation.—When we watch anything with attention we are said to observe it. The process implies more than a mere look, although it often involves little or no conscious effort. But unless we more than merely see the things, we cannot strictly be said to observe. We must also see what parts the thing is composed of. It is the *careful notice* which the teacher seeks to cultivate by his teaching. All observation must be *precise*, and it must exclude everything not to the point. If possible, the object should be viewed under as many conditions as possible: the phenomena observed should be isolated from everything else whilst the observation is being made. In science, observation usually precedes experiment. In fact, in some sciences, like astronomy, many physiological phenomena, and in meteorology, the only means open to us of ascertaining the effect of a given cause is by observation. Again, if you want to *ascertain the cause of a given effect*, you can only do it by observation. “We can take a cause and try what it will give; but we cannot take an effect and try (*i.e.*, experiment) what it will produce” (Mill).

II. Experiment.—Observation and experiment are the two great methods for education in science, but very often they overlap to such a degree that it is difficult to tell where the one ends and the other begins. Every experiment implies something more than an observation. The knowledge derived from experiment is more precise than that of observation; in fact, as much may be learnt from a few experiments as from years of observation very often. Hence the teacher should make the fullest possible use of experiment in his teaching; it will be his greatest guarantee *that his pupils* are learning truths, and not words merely. The

sequence of teaching is always from the known to the unknown ; and apart from the interest the teaching may excite, it should show to the class the nature of the many common things around them, and furnish the reasons for the existence of such things. But the teacher must not be too ambitious in his experiments. He must remember the tender age of his class, and so make his experiments as simple as possible. If you want to *find the effects of a given cause* you must use experiment. In this it is the converse of observation.

III. Illustration.—The work of illustration is to light up, or make clear, a point or statement in a lesson, and, properly used, it is very valuable. Many a difficulty can be lightened, explained, and fixed by suitable illustration. “A good illustration is worth two arguments—it conveys what is intended and carries conviction.” It follows the sequence of teaching by explaining the unknown by the known. They require to be freely used ; for at every point of a lesson where new matter presents itself, illustrations, varied in form and nature, may be required. They may be divided into three classes—oral, pictorial, and material.

I. Oral.—These take two well-marked forms—example and analogy—and they may consist of similes, metaphors, personification, proverbs, or anecdotes. In using them the teacher will sometimes avail himself of—

- (a) **The Instructive Method**, in which the definition is given and followed by the direct statement ; or
- (b) **The Educative Method**, which is based upon a collection of examples used as verbal illustrations.

“Children are required to take the examples and illustrations supplied, and, by way of comparison and contrast, to discover truth for themselves ; and, through the effort, to get a thorough training in the processes of thought, which in after life will be vastly more valuable than whole stores of fragmentary facts and statements.”

A. Example.—Here the general is illustrated by the particular. We are to love one another (general) because God first loved us (particular). Example is really a form of resemblance. This will be best seen by an example or illustration.

- (a) “The earth possesses spherical shape, rotation on axis, and an atmosphere.
- (b) Venus resembles the earth in possessing the former set of properties.
- (c) Therefore Venus is inhabited.”

There is a simple or mere resemblance of the former set of properties (*i.e.*, each has an atmosphere, etc.), and we infer the latter (inhabited).

B. Analogy.—By analogy we mean an agreement or likeness between things in some circumstances or effects when the things are otherwise entirely different; *e.g.*, when we say that *learning enlightens the mind*, we recognise an analogy between learning and light, the former being to the mind what light is to the eye, enabling it to discover things before hidden. Analogy is sometimes confounded with similarity, but improperly. *Similarity denotes general resemblance; analogy implies general difference*, with identity or sameness in one or more relations or functions. Thus there is analogy, but no similarity, between the lungs of animals and the gills of fishes. In *geometry*, equality, proportion, or similarity of ratio ($2:6::3:9$) is an analogy. In *grammar*, conformity to the spirit, structure, or general rules of a language, similarity in respect to any of the characteristics of a language, as derivation, inflection, pronunciation, etc., are analogies. *It is the illustration of the particular by the particular.* "Two things resemble each other in one or more respects; a certain proposition is true of one of them; therefore it is true of the other."

2. Pictorial.—The love of pictures is almost universal, hence a pictorial illustration appeals to a child at once. But they must never be introduced till the need of them is felt, because from the interest they excite they are likely to become ends and not means. Remember they are only means to an end, and they must not be so used as to smother the point they are meant to illustrate. A verbal description should accompany their use. This adds to their value. But the best pictorial illustrations are *hand drawn* by the teacher. The children see the drawing grow under the teacher's hand, who sketches it any size he likes within the limit of the B.B. The children are more ready to *imitate* a sketch than a printed picture, because they have seen it to be possible in the teacher, and because, all unnecessary parts being omitted, the task is *easier*. *Any part of the drawing can be taken out, enlarged, and specially dealt with; whilst the use of coloured chalks lends clearness and brightness to the whole thing.*

3. Material.—This class includes such material objects as apparatus, models, specimens, etc. Information conveyed verbally needs much repetition, or it is soon forgotten; but only present the object, and its mental image remains and carries the teaching with it. The children see and handle the objects; faith is lost in sight, and the *spirit of verification* thus formed will be very valuable.

Tests of their Value.—These will be gathered from what has already been said.

1. True.—They must be true and real. When oral, the illustrating statement must be true, or it should be stated to be otherwise.

2. Subordinate.—They must not override the truth or fact itself.

3. Appropriate.—Whether you use example or analogy, a picture or an object, see that the cases are properly related to each other.

4. Familiar.—So far as possible, they should deal with the facts and incidents of child life; otherwise, it will be a case of the blind leading the blind.

5. Distinct.—They must be clear and graphic. The essential points must be placed distinctly before the class by the illustration.

6. Time.—They should not be used till needed.

7. Variety.—They should be varied. But the ability to give varied illustrations on the many subjects in a school curriculum demands a well-read and a well-stored mind.

IV. Classification.—Elementary science demands a knowledge of the simple principles of classification; and classification has been defined as the arrangement of things, or our notion of them according to their resemblances or identities.

It is one of the most constant occupations of the mind. Things are good or bad, old or new, nice or nasty, etc., to us from our earliest memories. The teacher's aim then is to utilise this habit, and direct it into the channel of intellectual work. "The *object* of a classification is the best possible ordering of our ideas in reference to things; or to make us think of those objects together which have the greatest number of important common properties. Its *general problem* is to provide that the things be thought of in such groups, and these groups in such an order, as will best conduce to the ascertainment and remembrance of their laws" (Mill). By it we seek to reduce multiplicity to unity; and thus, when we know an object belongs to a certain class, we can infer of all the other members of that class the properties which we know to belong to this particular object.

It will thus be seen that classification is a great economical force, reducing the labour of memory, and bringing a mass of knowledge within our grasp by rendering it easier of acquirement. It naturally follows on *abstraction*, for we cannot form a class until we have abstracted the common qualities of that class. The process of classifying is as follows:—

1. Look for a *type*; i.e., ascertain what classes of objects possess a general resemblance to each other.
2. Then determine what *characters* these resembling objects have in common.
3. Then constitute your *class* by means of some of these resemblances.

Take as an example the sub-kingdom of flowering plants. They possess a general resemblance (flowering), and so give us our type. We find on examination that these resembling objects have certain characters in common; e.g. :—

Dicotyledons.	Monocotyledons.
<ol style="list-style-type: none"> 1. Embryo with two cotyledons. 2. Primary root growth exorhizal. 3. Growth of wood with open bundles, exogenous. 4. Leaves net veined. 5. Parts of a flower arranged, as a rule, in fours or fives. 	<ol style="list-style-type: none"> 1. Embryo with one cotyledon. 2. Primary root growth endorhizal. 3. Growth of wood with closed bundles, endogenous. 4. Leaves parallel veined. 5. Parts of flowers arranged in threes.

Out of these resembling characters we constitute our class dicotyledon or monocotyledon.

Classification will apply to most branches of a teacher's work, but zoology and botany furnish the best examples ; *e.g.*, *plants* may be arranged according to the country from which they come ; according to locality, length of life, size, properties, etc. In *botany* classes may be formed according to the number of stamens and pistils, or according to the differences in the seed vessels. " The progress of *chemistry* is rapidly rendering it a science of classification. An artificial classification of the chemical elements is necessary for the detection of substances. Hence arrangements of the elements according to characters of very minor importance are made, because they can be made with ease and accuracy."

V. Reasoning.—Reasoning is the mental process by which we detect similarities. A bad reasoner cannot see where similarity ends and difference begins, and the cultivation of the reason aims to give this power. Reasoning is progressive. Animals reason ; and the first efforts at reasoning by a child start from no higher level probably. Eventually the mind is able to grasp distinctly a general truth, and to draw conclusions from it. According to George Eliot, too much reasoning may be done. " Reason about everything with your child, and you make him a monster, without reverence, without affections." Reasoning is required by nearly all subjects in the school curriculum ; but it is specially cultivated by such subjects as history, problems, grammar, and the physical sciences. There are two methods of reasoning.

1. Inductive Reasoning.—Here a number of facts or principles are examined and compared, and through them a general truth is reached. A child reasons thus :—

He knows men die.	} And so he concludes that all mortals die, which is a general truth.
He observes some women die.	
Some boys die.	
Some girls die.	
Some babies die.	

Some indications are *spontaneous*; e.g., "The burnt child dreads the fire". Inductions have to be regulated, for by their aid a child gains a large amount of general knowledge (1) About the properties of things; (2) About the causes of changes in things; (3) About the simpler truths of space, quantity, and number. The process of regulating knowledge may be seen as follows:—

The child knows its father smokes.

The men who visit its father may smoke.

It sees men in the street smoke.

Hence it concludes that "all men smoke".

By-and-by it notices men who do not smoke. The induction is then regulated to "Some (not all) men smoke".

Furthermore, the child gets its first idea of *cause* from inductive reasoning. He finds that fire burns, water wets, food satisfies hunger, etc., and so concludes that everything has a cause.

2. Deductive Reasoning.—By inductive reasoning a child picks up a mass of information, and gets some knowledge of the laws of induction. He then proceeds to *argue as to the effects of these laws in other cases*, and then appeals to experience to verify or condemn his conclusions. Now there are three steps in this process of deductive reasoning.

(a) There is the general truth which is obtained by inductive reasoning (*induction*).

(b) There is the arguing as to their effects in other cases (*deduction*).

(c) There is the process of *verification* by experience.

e.g., All mammals suckle their young (*induction*).

The whale suckles its young.

∴ The whale is a mammal (*deduction*).

And *experience* corroborates this.

The essential process, as in induction, is detecting similarity or assimilation. We bring a particular case (the whale) under the general rule or principle (suckling), and we do this because we recognise similarity between the particular case and the cases included under the general rule.

Deductive reasoning is the great feature of scientific knowledge. The more deductive a science becomes, the more perfect it becomes, as in the case of mathematics. Most of the great scientific discoveries are the result of deductive reasoning. The composition of light, the barometer, the thermometer, gravitation, the undulatory theory of sound, and the conservation of energy, are some of these discoveries. The teacher will have plenty of opportunity for using deductive reasoning in the teaching of elementary science; for such simple facts as the cracking of a glass by hot water, fanning when hot, etc., could be explained by this method.

CHAPTER XVI.

MUSIC.

ITS VALUE IN SCHOOLS.

1. Pleasure.—The primary objects of school music should be for pastime and pleasure. It is perhaps the most exceptional as well as the cheapest of human pleasures. It is undoubtedly a substantive contribution to the enjoyment of life. "Of all the fine arts, the most available, universal, and influential is music" (Bain).

2. Physical Advantages.—It opens the lungs and aids circulation. It is stimulating in drill and marching.

3. Discipline.—The consensus of will, when all unite in some beautiful song, is of great value to discipline. The scholar becomes a unit in a body more or less large, where he has to submit entirely to the rule and guidance of the conductor.

4. Ethical Advantages.—Some forms of music educe the moral virtues and the nobler characteristics of the mind. A musical strain exerts, oftentimes, an immense power over the mind to animate, to encourage, to soothe, and to control. Some, however, deny that it has any permanent moral influence. There are, moreover, certain quasi-spiritual relations in singing which we do not yet understand fully.

5. Patriotism.—"One of the chief means of diffusing through the people natural sentiments, is afforded by school songs, which embody and express the hopes of industry, and the comforts and contentment of household life; and, preserving for the peasant the traditions of his country's triumphs, inspire in him confidence in her greatness and strength. The national legend, frequently embodied in songs, is the peasants' chief source of that national feeling which other ranks derive from a more extensive acquaintance with history. The songs of any people may be regarded as

important means of forming an industrious, brave, loyal, and religious working class."

ITS AIM.—The aims of school music are largely suggested by its value, and the items of value have just been enumerated. But more particularly its aims may be briefly enumerated as follows :—

1. To teach to sing by ear and note. To train the ear and voice so as to give power to appreciate and perform music.
2. To enable a pupil to leave school capable of reading and understanding popular music, both sacred and secular.
3. To train in sacred music for public worship.
4. Music is an innocent recreation. An early taste for music may exert a beneficial influence upon the choice and character of the amusements of the people.
5. To cultivate patriotism, industry, loyalty, and religion.

CLASSIFICATION.—This will vary in different schools, and must depend on—

1. The size of the school.
2. The arrangement of the rooms.
3. The number of the qualified teachers upon the staff.
4. The length of the school life.

For ordinary schools four divisions are suggested; but for smaller schools fewer divisions will be necessary, and the work must be graded to suit. This grading will be a fluctuating quantity, and will largely depend upon the organising ability of the teacher.

Division I. for Infants.

„ II. „ Standards I. and II.

„ III. „ „ III. and IV.

„ IV. „ „ V. and upwards.

In smaller schools with fewer divisions less should be attempted than in larger schools. The range of instruction must be restricted, or more work is thrown upon teachers and scholars just where circumstances are least favourable for any increase of burdens.

The Two Notations Compared.

Tonic Sol-Fah.	Old Notation.
<ol style="list-style-type: none"> 1. "It combines scientific accuracy with modes of expression the most direct and simple." 2. It is quicker and easier, and therefore more suited to children. 3. It is the notation generally used in our primary schools. 	<ol style="list-style-type: none"> 1. It is scientific, graphic, and universal, whilst tonic sol-fah is local. 2. It is suited to instrumental music. Tonic sol-fah is not used, except in rare cases, for this purpose. 3. It is the recognised music language of the civilised world.

THE TWO NOTATIONS COMPARED—*continued.*

Tonic Sol-Fah.	Old Notation.
<p>4. Its time names and its system of spacing by continuation lines make the teaching of time easier and more thorough.</p> <p>5. Modulator advantages:—</p> <p>(a) Difficulties can be presented singly.</p> <p>(b) Attention can be paid to particular difficulties.</p> <p>(c) Attention of a whole class can be obtained.</p> <p>(d) Mental effects can be illustrated.</p> <p>6. It is a splendid aid to the old notation, and a stepping stone.</p> <p>7. The perpendicular modulator is an advantage, because it pictorially represents the higher and lower notes of the scale.</p>	<p>4. It is the medium of expression used by the world's greatest masters, and their works are written and preserved in it.</p> <p>5. "It can claim all the modulator advantages of the other notation, and something more; for having once conquered the modulator, the end is attained; whilst the tonic sol-fah disciple has to attack the old notation without a modulator to assist him."</p> <p>6. In old notation the staff is really the modulator, and on it are pictorially represented musical intervals, whilst in tonic sol-fah the modulator is at right angles to the notation.</p> <p>7. Most students who continue their musical studies ultimately revert to it.</p>

VOICE TRAINING.

1. Tone.—The teacher should aim to get a soft, clear, round, sweet, and yet full quality of tone.

The voices should blend. Generally, individual voices should not be distinguishable at a short distance. For this purpose it is best to cultivate a medium strength of tone, or the singing will inevitably be flat. With moderately soft singing it is also often flat, hence the range and key should be suitable. The range should be small at first, and should be gradually extended. Each note should be brightly and clearly attacked, and there should be no sliding or slurring allowed. Cultivate downwards. It is urged by eminent authorities that "in this way the sweetness of soft high notes can be best imparted to the whole voice; whereas, if the upward moving exercises are always used, the tendency is to use the thicker and heavier tone on the high notes". Hence the teacher will train in scale exercises from doh¹ to doh, and not conversely, as a rule.

2. Breath.—The breath should be thrown well forward upon the front palate, and immediately behind the roots of the upper teeth.

Breathing exercises without singing are very essential, as either too little or too much impairs the quality of the singing. There should be exercises in inspiration, expiration, and retention or holding of the breath. This should be done at the teacher's dictation. The pupils should keep their mouths shut in these exercises. Odd minutes may be used in this way, and when standing the class should be trained to take a series of breaths without moving the shoulders. The inspiration should be deep; the expiration slow and gradual. Pupils should never breathe in the middle of a word, or between words closely connected in sense, or anywhere where it is likely to spoil the continuity of the words, or the flow of music.

3. Articulation.—The articulation should be clear and distinct.

Bad articulation is one of the greatest faults of singers, especially amateurs. It is often impossible to recognise many of the words sung, and others are only recognised by the aid of the context. The sense of the words must be properly rendered by distinct articulation and proper expression. The reading lessons

can be turned to account here, for a satisfactory spoken articulation is a good stepping stone to a musical one. The shape of the mouth, and the proper rendering of the vowels, will be the chief points requiring attention. Certain vowels, like *a* (father), *a* (fate), *oa* (woad), and *oo* are "forward" vowels, and should be sung well forward in the mouth; *e* is difficult, and requires a clear parting of the lips.

4. Practice.—Voice exercises should be given.

The practices should not be too long. Little and often is best. For musical purposes children's voices soon tire. The aim of the practices will be to produce a good quality and to maintain it. For this purpose it will be again necessary to remind the teacher that the exercises should be carefully chosen as to range and key, and graded to suit the varying vocal endowments of the children.

5. Posture.—The attitude of the children must receive close and constant attention. There can be no good production if associated with unnatural or unsuitable methods.

The children should stand to sing; upright, with heads erect, shoulders well back, and the chest well forward. These positions must be easy and natural. It is a good practice to go through a little chest drill before beginning the singing. Practices like some of those used in dumb-bell exercises are best; these get the shoulders back and expand the chest. They must be taken moderately, or the breath will be impaired in some cases.

THE COMMON SCALE.

I The Starting Point.—Explain the meaning of scale, and illustrate from both notations. Then choose any tone. This is the starting point; the key tone or tonic. Call it **doh**.

Make the class understand that of themselves different notes possess no peculiar property or tone character—nothing more than variation in pitch. But thoroughly impress a given sound on the ear, and all others will bear a proper relation to, and will circle round it. The note to be impressed is the tonic. The other notes of the scale then take up certain definite relations to it. This will be illustrated by the mental effects of the notes of the scale.

II Mental Effects.—These must be gradually *felt* by the class. *Contrast* and plenty of *repetition* will be the aids to apply.

1. Teach the fifth (*soh*). The class notes its effect, but the teacher need not yet name it. Practise in various keys.
2. Teach the third (*me*). Proceed as with the fifth.
3. Then combine exercises on the *tonic*, the *fifth* and the *third* in different keys; *i.e.*, practise the class in the *doh* chord (d-m-s). The notes harmonise. There is tonic sympathy, and the chord gives conclusive satisfaction.
4. The tonic should then be taken with the second, fourth, sixth, and seventh notes of the scale. The class now feels the effects of tonic contrast. The notes do not harmonise, but dissonate. Each interval creates a want.
5. The class should now be ready to contrast and name the mental effects of the scale. Each in its turn should be contrasted with the tonic and with the others. The teacher will then be able gradually to fill in the effects against each note as he writes it on the B.B., thus:—

DOH¹—Strong or firm tone (octave).

TE—Piercing or sensitive tone.

LAH—Sad or weeping tone.
 SOH—Grand or bright tone.
 FAH—Desolate or awe-inspiring tone.
 ME—Steady or calm tone.
 RAY—Rousing or hopeful tone.
 DOH—Strong or firm tone.

The children do not grasp these differences at once. Plenty of repetition and illustration will be required. Subsequently the teacher will show that all these effects are modified by pitch, harmony, quality of tone, and rate of movement. These differences or modifications must be practically demonstrated, and then the attention of the class must be fixed by the application of contrast.

THE MODULATOR.

The modulator should not be used until the major scale is impressed on the ear. This scale and its mental effects will be taught by ear. Every lesson then contains some modulator practice. The teacher should point the modulator, and the class should sing *without* pattern after the initial lessons. The pupils should be taught to sustain each note as long as the pointer is kept upon it. The wall charts and sheets should be used for exercises. The key tone should always be pitched well within the range of the class voices, and the melody should be sung in tune. The intervals should be carefully graded according to the requirements of each division. There should be no random pointing by the teacher. The class should sometimes sing in sections, and the teacher will then be able to discover where the weakness and strength of his class respectively lie. *Sol-fah-ing* should always be followed by *laa-ing*, and in later lessons the pupils should sing to *lah* always, only falling back on the *sol-fah* names for corrections. Transitions should be carefully introduced, the removes appearing in their proper order.

Early Lessons in Tune.

1. Explain pitch and key tone.
2. **Pattern Singing and Class Imitation.** The teacher gives some pattern singing; the class listens, and then repeats the tones sung by the teacher. The teacher should not sing *with* the pupils, but proceed as follows:—
 - (a) The teacher sings a tone to *lah*. The class imitates. The teacher tells them that is their *key tone*.
 - (b) The teacher sings this tone and the fifth (*soh*). The class imitates.
3. **Key Change and Self-Effort.** The teacher gives *another* key tone. The class sings it and tries to give the *soh*. The teacher practises this interval by frequently changing the key. The dominant range (♮ to ♯) must be systematically studied, because the mental effects of the scale tones are somewhat modified by the prominence given to the fifth of the key. The class must not be practised too exclusively in low keys, because, then, children often fail when asked to sing in a higher key.

4. **Introduce the Mediant.** The teacher sings *me*. Then there is pattern singing, imitation, self-effort, and practice in various keys; *e.g.*, **d, m, s, m, s, d, s, m, s, d.**
5. **Introduce the Octave.** The exercises can now be increased in variety.
6. **Manual Signs.** These should be used. They introduce variety, help the mental effects by association, often save time, and demand close attention. In Division II. no leaps should be made to or from the second, fourth, sixth and seventh notes; *i.e.*, tonic contrasts should be avoided. In Division III. any intervals may be given, hence the teacher should become proficient in the ready production of manual signs.

HOW TO ARRANGE A SCHOOL MUSIC CLASS.

For systematic instruction in singing, Mr. John Evans makes some very practical suggestions. He recommends that you should **sort your pupils**, to make it possible for all to learn quickly and pleasantly; *i.e.*, you should arrange your pupils according to their natural musical ability. He further recommends that you should place the most promising at the back of the class, and the least promising in front near the teacher, and he points out certain *advantages for this arrangement*.

1. The teacher gets the *result* he wants with less friction and labour.
2. It gives the teacher the opportunity of *rewarding* those that make most progress by giving them a place with the selected voices.
3. *Pure intonation*, which is the chief thing to be worked for, will be obtained more quickly and easily.
4. It affords great help in *voice training*, as the best voices serve as models for the others, and give the tone required, especially in classes where the teachers cannot pattern the tone they want.
5. It materially *helps to cure flat singing*, for the flat singers are placed in front, where the other singers hear less of them.

How to Find the most Promising Voices.

1. For Standards I. and II. the teacher stands in front of the class and calls on ten or twelve to listen to him whilst he sings the following phrase:—

Key G. **m, d, s, l, s.**

2. The children imitate, and the sweeter and purer voices are easily detected and placed.
3. Then try the whole class in the same way.
4. In Standard III., instead of testing by imitation, a suitable exercise should be written on the B.B.; or the teacher may dictate a phrase.
5. The altos should be tested by themselves.

EAR TRAINING.

No branch of school music is so difficult to teach as this, for the subject is inherently difficult. But any lack of endowment on the part of the pupils can be more or less successfully met by carefully graded teaching; and some useful suggestions for this purpose were set forth in one of the early numbers of the *School Music Review*, the chief points of which are embodied in the following hints:—

I. Requirements for Success.

1. **Capacity.**—The teacher must be capable. He must have a cultivated ear himself, and, unless he has an instrument, he must be able to sing in tune. His enunciation must also be good, his vowel pronunciation being correct.
2. **Time.**—Some part of each lesson must be set aside for training the ear. About one-fifth is generally recommended.
3. **Gradation.**—The exercises must be carefully prepared and graded.
4. **Variety.**—The exercises should also be varied.
5. **Suitability.**—They must be adapted to the ability of the class.
6. **Classification.**—The pupils should be classified, because ability varies, and the classification should be carried on to the limits of the staff. A good classification acts as a powerful stimulus.

II. Its Stages.—There are practically three stages.

A. Imitation.

1. If possible, a musical instrument should be used, at least as a change. The voice may be used later if the teacher is thoroughly capable, but he should begin with the instrument for the following reasons :—
 - (a) It is safer.
 - (b) It is easier.
 - (c) The pitch can be varied.
 - (d) It prevents the class getting too used to one voice.
 - (e) It removes the vowel difficulty.
2. The imitation proceeds as follows :—

The teacher sings a few notes.	The class imitates.
The teacher <i>laas</i> the same notes.	The class again imitates.

 The teacher then graduates his exercises somewhat as follows, and this introduces the second stage—discrimination.

B. Discrimination.

1. The pupils tell—
 - (a) Any arrangement of a three-tone key chord, as \bar{d} , s , m , or C, G, E.
 - (b) The same, without the first note being told.
 - (c) Any arrangement of a four-tone key chord, as \bar{d} , s , m , d^1 , or C, G, E, C', the first note being told.
 - (d) The same, without any note being told.
 - (e) Alternatives. The teacher sings.

s, t, d^1		s, l, s
G, B, C'		G, A, G

 And then asks which he sings; *i.e.*, the class discriminates.
 - (f) Any three tones commencing on some tone of the key or doh chord.
2. There must be plenty of practice to *laa*.

Do not begin too soon. Wait till the pupils can command a fair amount of ability in sight singing, whilst using the sol-fah syllabus. Otherwise there is guessing, or a following of a few leaders. Again, do not trust too much to the value of collective *laa*-ing, for the weak are too much at the mercy of the strong. Individual work must supplement.

C. Dictation.—The three stages, imitation, discrimination, and dictation, will now proceed together, affording mutual assistance. Collective *laa*-ing exercises will still be necessary, but they must be well graded, and not too abundant as they are fatiguing. *Manual signs* should be used in all the stages, for in addition to introducing variety, they fix the attention and strengthen the power of concentration; they have been already shown to have a valuable connection with the mental effects, and they act as a fine substitute for the modulator, and so train for sight singing at the same time. Furthermore, they are an aid to discipline, as they allow the teacher to exercise greater vigilance over the class, and they make the work more thorough by enabling the teacher to detect the lazy, timid, and indifferent.

III. Teaching.

1. Give laa-ing Exercises.—Some such scheme as the following is suggested :—

- (a) The teacher sol-fahs easy phrases, and the class repeats, singing to lah.
- (b) The teacher dictates short easy phrases, and the class sings them (1) to sol-fah syllables, (2) to lah.
- (c) The teacher dictates and directs. The class sings up or down the scale, repeating one tone or omitting as directed.
- (d) The class sings one stated tone of the scale to *lah*. The teacher sol-fahs other tones, and the class tries to repeat the first stated tone.
- (e) The class sings a phrase. The teacher sol-fahs another phrase, and the class tries to repeat the first phrase.
- (f) The teacher writes a timeless exercise on the B.B., points to it very slowly, making a pause of a second or two between each two tones; and the class has to think of the next tone before it is pointed to—a very valuable collective exercise.
- (g) The class sings to *lah* a very short easy phrase, and it then makes varied additions to the phrase as dictated by the teacher.

2. Give easy Ear Exercises.—In giving these, and in testing, observe the following rules :—

- (a) Sing each ear test twice before proceeding to the next.
- (b) Change the key, so that no two consecutive tests are in the same key.
- (c) Sing the *doh* chord to *lah* slowly before each test; and again in the same key before the second test.

3. Mental Effects of Scale Tones.—When a fair power of observation is gained, the peculiar effect tones of the scale have upon one another can be used. The mental effect of a tone is roughly the sum of its relations to all the other tones of the scale. *Verbal explanation is not much good; mental effects must be felt, not understood.* They must be repeatedly and pointedly demonstrated, and then the sol-fah syllable truly becomes the name of a tone, the name of a sensation. Close attention is necessary. To get this let the whole class sing the chord, and then let one of the class sing the tone.

4. Graduation.—Give a graduated course of moderate difficulty. The teacher will write something like the following on the B.B., and the class will have to discover what tones are sung at the blanks. Fewer tones should be given as the class progresses.

1	2	3	4	5	6	7	8	9	10
d	s		r	l	s				d
C	G		D	A	G				C

5. Accumulating Exercises.—These cultivate a keen observation and a good memory for tune.

- (a) The teacher sings a short and perfectly easy phrase; e.g., d, r, m.
- (b) The class answers correctly.
- (c) The teacher sings the same phrase and adds two notes.
- (d) The class again answers correctly.
- (e) The teacher then adds two more notes, never adding until the previous phrase is correctly recognised.

6. Written Exercises.—These are very valuable exercises. Slates or paper can be used, but paper is best for obvious reasons. The teacher writes

down a number of tones to be used in each line, numbers, and properly spaces them. (He should explain the whole plan of the exercise.) If the test occupies, say, four lines, like a a hymn tune, two or three notes should be given in each line.

	1	2	3	4	5	6
First Line - - - - -	d C			fah F		
Second Line - - - - -		r D	d C			r D
Third Line - - - - -			l A	s G		m E
Fourth Line - - - - -		s G		m E	r D	d C

TIME AND TUNE COMBINED.

Exercises combining time and tune are now required in the higher divisions, but it is not wise to wait till those divisions are reached before any attempt is made to combine the two in teaching. Children must be taught to read at sight, if their knowledge is to become power. The work must be graded and well arranged, so that the difficulties may be gradually approached.

1. **Grade your Exercises.**—The *School Music Review* recommends:—

- Choose those containing easy intervals. Exercises with repeated notes are generally easy, because they allow the attention to be largely directed to the time.
- Intervals in the key chord or doh chord are easy.
- Passages that creep from note to note, as it were, are easy when compared with passages containing free leaps.
- Short continuations are generally difficult. The rhythm may be difficult quite apart from the intervals.
- Rests, preceded by a continuation, often give trouble.

The following are given as illustrative examples:—

KEY F.

$$(a) \left\{ \begin{array}{l} d : d.d | d : m | s.s : s.s | s : -- \end{array} \right\} ||$$

KEY G.

$$(b) 1. \left\{ \begin{array}{l} d : s | m : s_1 | d.s_1 : m.d | s : -- | s.d m.s_1 | d.m : s_1.s \\ f : m.r | d : -- \end{array} \right\} ||$$

KEY G.

$$2. \left\{ \begin{array}{l} t_1 : f | r : f_1 | r.l_1 : f.r | l : -- | l.r : f.l_1 | r.f : l_1 \\ t_1 : s | d : -- \end{array} \right\} ||$$

KEY C.

- (c) $\left\{ \begin{array}{l} \text{d} : \text{r} \mid \text{m.f.} : \mid \text{l} : \text{s} \mid \text{s.f.} : \text{m} \mid \text{m} : \text{f.s.} \mid \text{l.s.} : \text{d} \end{array} \right\}$
 $\left\{ \begin{array}{l} \text{t} : \text{l.t.} \mid \text{d} : - \parallel \end{array} \right\}$

KEY G.

- (d) $\left\{ \begin{array}{l} \text{d} : -. \text{d} \mid \text{r} : -. \text{r} \mid \text{m} : -. \text{d} \mid \text{d} : \text{s} \parallel \end{array} \right\}$

KEY F.

- (e) $\left\{ \begin{array}{l} \text{m} : - \mid \text{f} : \text{r} \mid \text{r} : - \mid - : \mid \text{s} : - \mid - : \text{f} \end{array} \right\}$
 $\left\{ \begin{array}{l} \text{m} : - \mid - : \mid \text{r} : - \mid \text{d} : - \parallel \end{array} \right\}$

It will be observed that two exercises are given under *b*. These show that it is not always the mere width of a leap that determines the difficulty; the particular members of the scale employed must be considered. The first passage is quite easy, whilst the second, although using much the same interval movement, is very much more difficult.

2. Preparatory Exercises.

- (a) Choose your exercise carefully.
- (b) Time it to the *time names*.
- (c) Time it to *lah*.
- (d) Sing it to the *sol-fah names*.
- (e) Sing it to *lah*.
- (f) Sing it, with *time and tune combined*, to the *sol-fah names*.
- (g) Sing it, with *time and tune combined*, to *lah*.
- (h) If there are any words, *sing to the words*.
- (i) Finally, sing with due regard for the expression marks.

3. Sight Exercises.—Here the piece should be *laa-ed* to time and tune at once, and then sung to the words with due expression.

4. Final Stage.—The piece should be taken straight off, with proper attention to the conductor. This is a difficult accomplishment, involving a rapidly shifting attention, and marking a high state of perfection. It is the final goal of all school musical effort, and must not be sought too hurriedly. Every previous step will require complete mastery before any efforts of this nature are attempted.

TIME.

How to Give the Idea of Time.—Appeal to the common *experience* of the children. They walk or run the same distance in unequal times; one cart goes faster than another; one train slower than another; and so lead the children to see that one sound follows another sometimes at regular intervals, sometimes at irregular intervals. Demonstrate this before the class. It will be observed that sometimes the sounds are quick; sometimes slow. Show this on some musical instrument, on some common

object, or by the voice. If the sounds follow each other in an orderly succession the effect is called **time**.

To Teach Accent.—Teach by talking and singing.

1. **Talking.**—The value of accent can easily be made apparent by ordinary speech. Repeat some *verbal* phrase in a *monotone*. Then repeat the same phrase in ordinary conversational style. The difference will be obvious to the children. That difference is made by *accent*. Illustrate further by single words. The accented syllable should be slightly exaggerated. *Verbal illustrations* should be given and asked for, and from these it will be noticed that in *every* word there is at least *one* strong accent; e.g. :—

beau'-ti-ful equals *strong, weak, medium*.
 di-ges'-tion „ *weak, strong, weak*.
 good'-ness „ *strong, weak*.

2. **Singing.**—Now sing a simple phrase in a monotone, making the notes of equal length and strength. Then repeat the phrase again with its proper accents. The difference will again be obvious, and it is again caused by *accent*. Now ask the class to say what accent is. They will tell you that some words are louder than others, or that one is more abrupt than the other. *Illustrations* should then be given from the tonic sol-fah or old notation—whichever may be taught in the school.

The Time Chart.—The teacher is not advised to introduce the chart *en masse* to the pupils. He will find it better to print that portion which he wishes to use upon the B.B. The whole chart is distracting to the attention of the ordinary scholar, and apt to intimidate the dull and weak. The lessons should be introduced as required, and little passages written on the B.B. to illustrate them. The lessons should fall at least into six classes, some of which will be introduced to the higher divisions only. The classes should be arranged as follows :—

Class 1. Wholes and halves.	Class 4. Sixths.
„ 2. Quarters.	„ 5. Eighths.
„ 3. Thirds.	„ 6. Ninths.

Plan of a Lesson on Time.

1. Commence with *two-pulse measures*. The class will *listen* to the teacher, who will *taa* a simple passage.
2. The class then *imitates*, the teacher beating time.
3. The class should then be divided into two divisions, and *each division* should *taa alternate measures*, still keeping the swing of the time.
4. The exercise should then be practised at *varying rates* of time.
5. The *accent* should be marked in *each* measure.
6. The exercise should then be *taa-ed*. This exercise is not important in simple measures, but it is more important when there is a variety of time names introduced.
7. *Continuation* lines and *half-pulses* might then be introduced, and exercises given upon them.
8. The *quarter-pulse* should not be introduced for some time, in fact not until the children reach a higher music class in large schools.
9. The *other measures* should be gradually introduced, but no harder time divisions than quarter-pulses should at present be included.
10. Harder time divisions (*thirds*, etc.) should be relegated to later lessons and more advanced classes.

Things to Remember in Teaching Time.

1. With the help of the time chart, time should be studied *separately* from tune—at first.
2. The teacher has to set up an *association* between syllable and rhythm.
3. The teacher should *pattern and point* on the time chart.
4. The pupils should *imitate*.
5. Then pupils and teacher should *taa-tai alternately*, measure for measure at first, and longer passages afterwards. 'This gives "swing".'
6. The *rate* should be varied.
7. The class should sing *without the teacher pointing*.
8. *Exercises* should then be written on the B.B., or sung from books.
9. Finally, the passages should be *taa-ed*.

Rhythm.—To teach this suitable examples should be given, in which the rhythm may be made obvious. Each time exercise should be *taa-tai-ed* on various tune forms. The method suggested is:—

1. The teacher prepares some suitable *time exercises*, and sol-fahs or sings one of them.
2. The teacher now points the same exercise on the *modulator*, but *taa-tais*.
3. The pupils *imitate*. The object is to show the sameness of the rhythm and the difference in the tune. The time names show the sameness of the rhythm, and the modulator the difference in the time.
4. The pupils should then sing the same exercises from their books, or charts, or from the B.B.

SONGS.

A. Choice of School Songs.—School songs should be chosen with some care, and with proper consideration for the nature of the music and the words.

I. Suitable Songs.—These will embrace:—

1. Those which express natural sentiments.
2. Those which express the hopes of industry.
3. Songs dealing with the comfort and contentment of household life.
4. Patriotic songs—such as preserve the traditions of the country's triumphs, and inspire the pupils with confidence in its greatness and strength. These will include some war songs, and the national songs; but the teacher must guard against anything like the glorification of war.
5. Songs embodying the national legends.
6. Songs dealing with chivalry, bravery, and loyalty.
7. Humorous songs. The humour should be wholesome and intelligible. These songs are very popular with the children.
8. Songs dealing with our national games.
9. Simple descriptive songs, like those dealing with the seasons.

II. Qualities of a Good School Song.

1. The *singing* must be sweet and in tune.
2. The *compass* of the song should be suitable.
3. The *words* should be such as the children can understand.
4. The *articulation* must be clear, and the *enunciation* easily intelligible.
5. The *time* must be exact.
6. There must be suitable *expression*.
7. The quality of the *tone* should be pleasing.
8. The *breath* must be properly managed.
9. The *position* of the singer must be healthy and suitable.
10. The *phrasing* must be good.

B. How to Teach a School Song.**I. For Young Classes.**

1. The words must first be learnt. One verse will be sufficient to begin with.
2. The tune or melody should then be learnt by imitation, phrase by phrase. An instrument should be used for this purpose where one is available. Otherwise, the teacher must vocalise the song.
3. The rest of the words should then be taught.
4. Plenty of practice, pattern work, and correction should follow.

II. For Higher Classes.

1. **Preparation.**—Dictate the melody, or write it on the B.B., or distribute books containing it. Neither is yet to be used.
2. **Modulator.**—Point the melody on the modulator. The class should *sol-fah* it, and afterwards *laa* it.
3. **Time.**—The class should then *time* the melody to the *time names* from the B.B. or otherwise, and then *laa* it in proper time.
4. **Melody.**—They should next sing the melody from their books or from the B.B. as the case may be. The melody should be thus repeated until it is known from memory.
5. **Memory.**—Then let the class point the tune from memory, on a modulator written on their slates.
6. **Ear.**—Give ear tests from and based upon the melody.
7. **Words.**—Have the words dictated, learnt, and explained where necessary.
8. **Song.**—The melody should then be sung to the words, the teacher striving to obtain the qualities enumerated above.

Part Singing.—This need not be confined to any one division.

1. Its Advantages.

- (a) It awakens a strong interest in singing.
- (b) It introduces variety.
- (c) It cultivates the sense of musical harmony, and so increases the feeling of pleasure derived from vocal music.
- (d) It cultivates the taste for a pure and cheap form of amusement.
- (e) It is an important aid to ear and voice training.

2. Its Teaching.

- (a) At first let the music be *simple* and *easy*. Do not be too anxious to murder ambitious pieces. This applies to time and tune.
- (b) Choose a *major key*, and at first have *no chromatics or accidentals*.
- (c) Commence with *rounds*. This trains their "holding" powers.
- (d) Then proceed to *simple part singing*. Before this can be done examine the children's voices, and arrange the class so as to have the worst voices in front, thus :—

Best trebles	Best altos
Inferior trebles	Inferior altos

Give the trebles and altos some separate training exercises, so as to get even production from both parts.

- (e) Let the whole class sing the alto (or second treble) before the first treble is touched at all. This is to be continued until the alto part is well rendered.

- (f) Where possible, then have the piece played, and let the whole class sing alto.
- (g) Have the treble well sung by the trebles. Repeat till well done.
- (h) Then let the two parts be sung together with the piano, and afterwards without the piano.
- (i) Have the words learnt, and the piece rendered with due expression in two parts, with the words.

SINGING FLAT.

Its Causes.	Its Remedies.
<p>1. Voice. The singing may be too loud; it may be forced, strained, or coarse; or carelessly rendered; or it may arise from physical weakness; or from neglect of breathing places, and consequent exhaustion; from weather (damp or cold); from overstrain or fatigue; or from a bad atmosphere in the school.</p> <p>2. Ear. There may be defects of the ear, and very often the remedy is slower in its operation.</p> <p>3. Discipline. The singing may be lax and careless, or the pupils may be inattentive, or in a bad position.</p> <p>4. No Interest. There may be a lack of interest from some cause or other. Cases of this sort are rare.</p> <p>5. Breath.</p>	<p>1. Make the pupils sing softly, and listen to the phrase when sung or played in tune. Test with the tuning fork or instrument. Practise in the key of C, and let the passage always finish on C'. Strike the fork on the last note. The flatness becomes thus a reality to the class, and greater efforts are made to conquer it. If the school possesses an instrument they can be similarly tested and corrected in any key. The remedies in the other case are obvious.</p> <p>2. Plenty of pattern singing will be required. Modulator exercises should be slowly sung from the pattern of the teacher or the instrument. This must be supplemented with ear tests and the study of mental effects.</p> <p>3. The remedy here is obvious.</p> <p>4. The cause must be ascertained, and if possible removed. The intrinsic charm of the subject will then create its own interest.</p> <p>5. See notes on voice training.</p>

HOW TO TEACH ROUNDS.

"The practice of teaching rounds is most valuable and interesting in class singing. Rounds are the happiest possible means of bridging the chasm between unison and part singing, and they often provide infinite delight and amusement for young pupils."

Teaching.

1. First see that your class is fit to commence the study. A class should be able to sing smoothly in unison before attempting even a simple round.
2. Silence the flat singers and growlers.
3. Next get your round. Let it be a simple one at first, with a range not greater than an octave.
4. Choose melodious rounds. They are easier to remember.
5. Do not choose rounds with rests, especially if the rests are on accented pulses. Plain smooth rhythm stands the best chance.
6. Words with a little innocent fun in them are sometimes desirable. Avoid words which are too obviously moral lessons.
7. Let the class learn the whole melody of the round as a unison song. It should be sol-fah-ed, then laa-ed, then sung to words.

8. Divide the class into as many sections as necessary. They can then be arranged either side by side, or behind each other. But the plan and furniture of the room will be an important factor in most arrangements. The one section behind the other is the best arrangement, because nearly every pupil can hear and feel the onslaught of the other parts.
 - (a) Make each section separately sing the round as a melody.
 - (b) The teacher should then "pit" himself against the whole class as the second part of the round.
 - (c) When possible, sing against each section. If the class is very large, subdivide the sections and sing against each.
 - (d) Let six picked pupils sing the round against the teacher.
 - (e) If successful, add six more.
 - (f) Then group the two sixes separately in a circle, and try them against one another.
 - (g) As this succeeds, keep adding to the number of each group until the two full sections are singing one against the other. This arrangement is recommended by high authorities for two-part rounds.
9. Three and four part rounds are more interesting, and will follow the others.
 - (a) Let them be sung first as two-part rounds, and sing the third part yourself.
 - (b) Divide the class into three sections, and make any two sections sing in two parts.
 - (c) Practise the three sections in three parts.
 - (d) Proceed in the same cautious way for four parts.
10. In choosing rounds with a view to give special practice in time, it is well to select those that have at least one part that firmly marks the beat or pulse.

DEFECTS IN SCHOOL SINGING.

The most common defects in school singing have been thus summarised by one of H.M. Inspectors :—

1. Want of voice cultivation, resulting in an unmelodious quality of voice, harshness characterising the boys' and stridency the girls' voices.
2. A faulty balance of voices, the boys' voices, as a rule, being too predominant. A proper relation of the two elements should be aimed at.
3. Insufficient weeding out of bad, untrue, and incurably harsh voices.
4. Inadequate range of voice, leading to the injudicious selection of too low keys.
5. Want of expression. The singing is often tame and apathetic, and the teacher is often a mere animated metronome.

PROPER DIVISION OF TIME.

For a half-hour's lesson the following arrangement of the time is recommended :—

3	minutes for	<i>voice</i> exercise.
5	"	modulator exercise for <i>tune</i> .
5	"	<i>time</i> —on charts and B.B.
3	"	<i>ear</i> —the teacher to give exercises.
6	"	<i>time and tune</i> —from charts or books.
8	"	<i>songs</i> —from books, as a rule.

QUALIFICATIONS OF A CONDUCTOR. (Barnby.)

1. Abundant technical knowledge.
2. Experience.
3. A strong will.
4. Magnetic influence.

5. A quick ear.
6. A sharp tongue.
7. A good memory.
8. A clear beat.

The conductor is not to be always looking at his book or his copy, but is to be *en rapport* with his class.

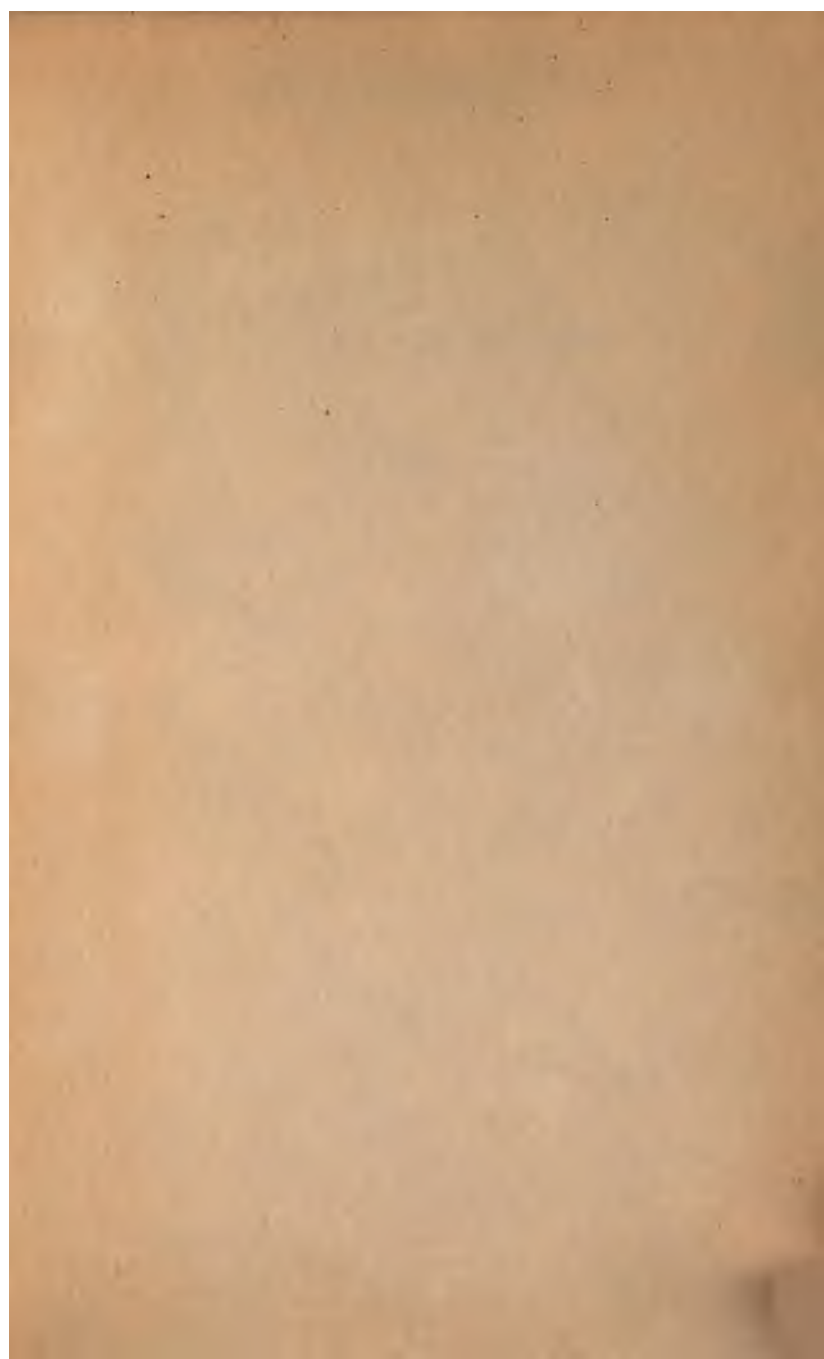
CHOIR EFFICIENCY.

There are some essential tests of efficiency in a choir or singing class.

1. Perfect time.
2. Good intonation.
3. Well-balanced parts.
4. The tone must be of good quality.
5. The expression marks must be accurately and tastefully rendered.
6. The articulation must be clear. The proper use of the lips, tongue, and teeth is much neglected.
7. The phrasing must be good. "Ragged edges" should be avoided. The attack should be simultaneous, and the release of the last note equally so.
8. There should be soul or feeling in the singing.

EXAMINATION QUESTIONS.

- 1.—Describe the best method of proceeding in teaching a new song to infants or to older children.
- 2.—Describe the method you adopt in teaching "singing by note" to a class of beginners.





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